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JOURNAL of the American Veterinary Medical Association

FORMERLY

AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

EDITED AND PUBLISHED FOR
The American Veterinary Medical Association**CONTENTS**

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THE JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION is issued the first of each month. Manuscripts and copy for insertion should be as nearly perfect as possible for the printer and should be received by the tenth of the preceding month to insure insertion in the next month's issue. Volumes begin in April and October.

Communications relating to publication, subscriptions, advertisements and remittances for the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION, as well as matters pertaining to the American Veterinary Medical Association and membership, should be sent to Dr. H. Preston Hopkins, Secretary-Editor, 716 Book Bldg., Detroit, Mich.

\$4.00 per annum

Foreign \$5.00; Canada \$4.25

Single Copies 40 cts. in U. S.

Entered as Second-Class Matter, March 15, 1923, at the Post Office at Detroit, Mich., under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917; authorized October 26, 1918.

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H. Preston Hoskins, Secretary-Editor, 716 Book Building, Detroit, Mich.

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Reprints should be ordered in advance. Prices will be sent upon application.

Vol. LXXII, N. S. Vol. 25

December, 1927

No. 3

WHAT'S IN A NAME?

The suggestion that a new name be found to replace "veterinarian" has been taken both seriously and otherwise by the public. Even if nothing comes of the proposal, the veterinary profession has certainly been the gainer as the result of the publicity that has been given the subject by the press throughout the country. It is doubtful whether the same amount of publicity could have been obtained in any other way. The newspaper comments, which followed the discussion of this subject at the Philadelphia meeting of the A. V. M. A. recently, have served admirably to direct to the attention of the public at large the widely diversified field of activities of the modern veterinarian.

Some of us have been in the habit of wincing perceptibly when we have heard ourselves designated as "horse doctors" in public, even though there is no particular disgrace in being thus referred to. It is extremely unlikely if any insult was ever intended by anybody in referring to a veterinarian as a "horse doctor." To a large extent, the custom of referring to veterinarians as "horse doctors" is a tradition that has grown up naturally—just like Topsy—as a result of the close association of veterinarians with horses for many years, even centuries. The truth of the matter is that the term, in the minds of some, at least, does not adequately express the function of the modern

veterinarian. That is about the only reason that we have at the present time for even considering any change in the name of the profession, namely, to hit upon some more appropriate and comprehensive nomenclature.

Even granting the desirability of bringing this about, we rather lean to the opinion that it would be easier to give a modern, up-to-date definition to the word "veterinarian" than to adopt a new word and then have to explain its meaning to everybody with whom we come in contact. Let us assume that we have the new word. We make use of it and somebody asks the meaning of the new term. We would probably reply: "That is the new name for veterinarian." We would practically be compelled to define the new word in terms of the old. Veterinarians are not the only ones who have suffered to some extent through a change of conditions with the passage of time. There are dozens of words that have lost their original meaning, but are steadfastly maintained. Then there is the danger that goes with a new word. It may be wrongly interpreted. Not so long ago a delegation of morticians—they used to be known as funeral directors—were taken for a group of brick-layers, according to a report from Washington.

Returning to the publicity which followed the discussion of the question at Philadelphia, we will quote paragraphs from an editorial that has been used by quite a number of newspapers throughout the Central West. This editorial appeared under the caption of "Misguided Humor" and referred, first of all, to the increase in the number and value of animals in the United States and the concurrent decrease in the ranks of veterinarians. The editorial stated:

The American Veterinary Medical Association thinks that this may be partly due to the clown humor which has coiled around the word "veterinary." It suggests use of a different title for graduates in this branch of medicine—something like Doctor of Animal Industry.

Misguided humor has wrought much mischief. In our time we have, for example, seen it contribute to the undoing of many articles which were very high in popular favor. The articles themselves were satisfactory, but they lost caste under the attack of humorists.

It is most unfair to a conscientious veterinarian, trained at much expense for a service of great importance, to make him the butt of cheap horse-doctor jokes. His professional value is beyond question. It is entitled to respect.

The editorial then asked the question whether the people are at all to blame for this condition. It was suggested that veterinarians take the proper steps to protect their profession, the same as any other. The question was asked: "If the veter-

inarian does not see to it that this is done, who will?" Then, quoting again from the editorial:

No farmer will permit the average man who claims to be a "hoss doctor" to inoculate his herd of hogs against cholera. Neither will the cattle owner, who has a herd of cattle, permit such a man to take a chance at administering to one of his herd. The educated veterinarian is called into service, but there is a lack of earnestness upon the part of veterinary surgeons to "sell themselves" to those who need their service and the public in general.

An editorial in the Knoxville (Tennessee) *Journal* drew attention to the fact that the A. V. M. A. has appointed a committee to hunt up a new name to replace that of "veterinarian." This editorial then went on to say:

This is in line with steps which have been taken by a number of other professions in recent years. It is a well-known fact that the majority of people, especially in their adolescent years and especially if they belong to the more romantic sex, are not altogether satisfied with the names bestowed upon them by their parents and wish they had been baptized otherwise. In the present year the same sort of dissatisfaction seems to trouble all sorts of professional, commercial and industrial groups.

It is not long ago that veterinarians were pretty well pleased to have that designation substituted for "horse doctor." In this fight circumstances have helped them out, but it now seems that this change has been one in form rather than in sense, because a veterinarian, being interpreted, is one who attends on beasts of burden.

Just what the veterinarians will call themselves in the future remains to be seen, but the attempt will be made to think up a dignified name more in accordance with present-day usage. Cow doctor would today be a much more exact definition than the older horse doctor, but there is also a good deal of practice among hogs and some among sheep and not a little among dogs.

Probably a Greek or Latin derivative, conveying the idea that services are rendered all sorts of domestic animals will best fill the bill.

When it comes to weighing sentiment among members of the profession, it immediately becomes apparent that opinion is divided. However, a majority of the veterinarians who have expressed themselves on the subject seem to be opposed to adopting a new title. One veterinarian has expressed himself as being strongly averse to the title "veterinarian" for the reason that it touches only a very small part of our activities. He expresses the fear that some of the names that have been proposed would prove to be tongue-twisters, especially to the general public. He is of the opinion that the titles "zoopathologist" and "zoophysician" hit the nail on the head, but he wonders what the poor layman would do when it came to applying either one of these. This same veterinarian rather favors the title, "doctor of comparative medicine," believing that it is both dignified and comprehensive. This veterinarian concludes his communication with the statement to the effect that he has not at any time since graduation used the title veterinarian on

his letter-head and he expresses satisfaction that there is some thought being given to changing the name.

One phase of the subject that seems to have been lost sight of, at least by the majority, is in connection with the secondary changes which would naturally have to be made when once we have decided upon a better noun than "veterinarian." We would have to select a word from which the proper adjective could be made conveniently. In other words, we will have to find a noun for the man and an adjective for the profession and allied organizations. The names of all our veterinary associations would have to be changed and just think what a job that would be.

From the humorous side, about the best thing that has come to our notice is the following poem, entitled, "What Shall We Call 'Em?" by Ted Robinson, Philosopher of Folly, who conducts a column in the Cleveland *Plain Dealer*:

*Vets do not like the name Vets;
"Hoss Doctors" is passe;
What are we going to call 'em? Let's
Decide it right away.
Morticians have been settled now;
White Wings are Asphalticians.
Can't we work out a name somehow
For Animal Physicians?*

*Beastosophist? Livestockopath?
Calleechee or Cowropractor?
Dogmatophist? Philhippomath?
Pighealer? Mulofactor?
These hit at specialties—and yet
They ought to, for the fact is
No up-and-coming modern Vet
Would touch a general practice.*

*Well, if an ailing dog or cat
Be mine, may good befall 'em;
I'll call 'em this, or call 'em that,
But anyhow I'll call 'em.
And for a title or degree
To set them off from others,
Their letters should be D. D. B.—
Or Doctors of Dumb Brothers.*

As the matter now stands, the question is in the hands of the Committee on Intelligence and Education of the A. V. M. A. This committee has been charged with the task of studying the question and all suggestions that have been made, with a view to reporting back to the Association, at Minneapolis, next year. If we are to have a new title or if a new word must be coined to replace "veterinarian," let it be done by some veterinarian rather than by someone outside of the profession. At any rate let us have some discussion of the subject.

CONVENTION NOTES

The State Association Conference, Monday evening, September 12, was attended by delegates from about twenty states.

State Veterinarian Joe H. Bux and Dr. Frank R. Osborn, of Little Rock, constituted the Arkansas representation at the convention.

A trio of members represented West Virginia; Drs. J. J. Cranwell, of Fairmont; S. E. Hershey, of Charleston; and L. N. Reefer, of Wheeling.

Two Florida veterinarians were among those who registered: Dr. Thos. J. Mahaffy, of Jacksonville, and Dr. D. A. Sanders, of Gainesville.

The following veterinary deans were at the meeting: Cary, Francis, Giltner, Glover, Klein, McGilvray, Moore, Richardson, Stange and White.

State Veterinarian Cotton was the only Gopher member at the meeting, but he was able to land the 1928 meeting for Minneapolis single-handed.

Delaware has twelve members in the A. V. M. A. and all were in attendance at the meeting. This is undoubtedly a record that will stand for some time.

A trio of Colorado veterinarians attended the meeting: Dean Glover, of Fort Collins; Dr. L. L. Glynn, of Monte Vista; Dr. Hugh C. Hare, of Denver.

Dr. O. E. Dyson, of Wichita, Kansas, secretary of the U. S. Live Stock Sanitary Association, attended his first meeting of the A. V. M. A. for quite some time.

Dr. Ivan B. Boughton, who is attached to the Service Technique, Port au Prince, Haiti, was at the meeting, renewing acquaintances with his former associates.

The only surviving members who joined the A. V. M. A. in 1897—Drs. I. K. Atherton, of College Park, Md., and Dr. J. C. McGrath, of Phoenix, Ariz.—were both at the meeting.

One of the "stunts" of the meeting was the appearance of a number of the Philadelphia ladies, attired in regulation Quaker costume, at the President's reception, Tuesday evening.

The following quartet looked after the interests of Wisconsin: Dr. B. L. Clark, of Monticello; T. H. Ferguson, of Lake Geneva; R. A. Garman, of Tomah; and L. A. Wright, of Columbus.

Missouri was represented by a quintet of well-known veterinarians: Drs. G. G. Graham, H. Jensen, A. T. Kinsley and Ashe Lockhart, of Kansas City; and Dr. J. W. Connaway, of Columbia.

Four veterinarians from the Pine Tree State were at Philadelphia: Drs. M. E. Maddocks, of Augusta; E. E. Russell, of Farmington; C. L. Ryan, of Dexter; and C. F. Davis, of Rumford.

The presence of Mess. D. B. Rodger (M. R. C. V. S.), London, and E. L., Taylor, Weybridge, Surrey, both of the British Ministry of Agriculture and Fisheries, added to the international aspects of the convention.

Texas was another state with a quartet of representatives: Drs. Mark Francis and R. P. Marsteller, of College Station; State Veterinarian Williams, of Fort Worth; and Dr. D. B. Fitzpatrick, of Falfurrias.

The Blue Grass State contributed seven registrations: Drs. W. W. Dimock, J. F. Bullard, T. P. Polk and E. M. Stemmler, of Lexington; Harry Gieskemeyer, of Fort Thomas; C. E. Stockton, of Versailles; and W. A. Wallace, of Ashland.

Seven members registered from South Carolina: Drs. W. A. Barnette, of Greenwood; F. P. Caughman, of Columbia; W. R. Latta and R. R. Salley, of Orangeburg; Benj. and B. Kater McInnes, of Charleston; and B. C. McLean, of Aiken.

Dr. F. E. Murray, of Salt Lake City, was the only member present from the state of Utah. Dr. Murray is President of the National Association of Bureau of Animal Industry Veterinarians and was looking after the interests of that organization at the meeting.

The Sunflower State had three members at the meeting: Dr. Chas. W. Bower, of Topeka, secretary of the Kansas State Veterinary Medical Association; Dr. H. F. Lienhardt, of Kansas State Agricultural College, Manhattan; and Dr. L. T. Richards, of Parsons.

Four veterinarians attended the 1927 meeting of the A. V. M. A. in Philadelphia who were in the picture of the 1894 Philadelphia meeting, reproduced in the September issue of the JOURNAL: Drs. C. A. Cary, F. H. Mackie, H. P. Eves and W. L. Williams.

Dr. B. T. Simms, of Corvallis, Ore., kept up his attendance record and was accompanied by Dr. Wm. H. Lytle, state veterinarian of Oregon. Dr. Simms was elected first vice-president and Dr. Lytle was honored with the secretaryship of the Section on Sanitary Science and Food Hygiene.

Just an even dozen Virginia veterinarians were present: Drs. L. E. Bowen, Lynchburg; Wm. G. Chrisman, Danville; Geo. C. Faville, Phoebus; W. T. Gilchrist, Norfolk; W. P. Weaver, Roanoke; I. D. Wilson, Blacksburg; J. T. Wilson, Hampton; R. E. Brookbank, J. G. Ferneyhough, H. C. Givens, Henry Marshall, and H. H. Rowe, Richmond.

Connecticut was another state to have an even dozen members in attendance: Drs. Peter B. Brown, Meriden; Geo. E. Corwin, Harold N. Guilfoyle, F. A. Ingram and Edwin Laitinen, Hartford; J. L. Devereaux, A. T. Gilyard and P. T. Keeley, Waterbury; Joseph DeVita and Joseph J. Flaherty, New Haven; I. R. Vail, Bristol; Wallace F. Vail, Greenwich.

Ten Wolverine veterinarians registered at the meeting: Drs. Giltner, Hallman and Huddleson, of Michigan State College; Dr. E. L. Krieger, of Benton Harbor; Dr. L. H. LaFond, of Flint; Dr. H. F. Leighton, of Pontiac; Dr. E. E. Patterson, Drs. A. S. Schlingman and Secretary-Editor Hoskins, of Detroit; Dr. M. S. Britten, of Perry.

North Carolina had eleven men at the meeting: Drs. S. A. Alexander, of Monroe; Carey L. Bell, of Durham; J. Howard Brown, of Rich Square; W. A. Hornaday, of Greensboro; H. Calvin Rae, of Charlotte; J. P. Spoon, of Burlington; A. A. Husman, William Moore and W. T. Scarborough, of Raleigh; A. C. Yow, of Henderson; W. A. Carter, of Weldon.

Indiana sent twelve members to the meeting: Drs. H. W. Brown, Fort Wayne; H. W. Demsey, Huntington; Lester C. Finley, Lapel; C. N. Finch, Jeffersonville; C. F. Finch and A. V. Johnson, New Albany; C. H. Goddard, Pine Village; R. C. Julien and F. J. Muecke, Indianapolis; L. C. Morgan, Greenfield; O. C. Shockley, New Ross; T. A. Sigler, Greencastle.

Illinois had thirteen members at Philadelphia, most of whom were from Chicago and immediate vicinity: Drs. D. M. Campbell, L. Enos Day, W. J. Embree, John J. Hayes, Wm. C. Holtz, N. S. Mayo and W. H. Timmons, Chicago; D. L. Cecil, Seymour; L. B. Huff, Aurora; J. S. Koen, Bloomington; J. V. Lacroix and L. A. Merillat, Evanston; V. W. Myers, East St. Louis.

Iowa was well represented, considering the distance from Philadelphia. Dean C. H. Strange, Drs. H. E. Biester, C. H. Covault and W. F. Guard, of Iowa State College; Dr. J. W. Haxby, president of the Iowa Veterinary Association; Dr. H. J. Shore, of the Fort Dodge Serum Company; State Veterinarian Malcolm; Dr. Henry Hell, of Wilton Junetion; Dr. C. E. Juhl, of Osage, were among those registered.

Prizes in the membership contest among the resident secretaries were awarded as follows: First, Dr. G. A. Dick, Pennsylvania, with 53 applications to his credit; second, Dr. H. C. H. Kernkamp, Minnesota, 29 applications; third, Dr. F. J. Muecke, Indiana, 28 applications. Dr. Wm. Moore, resident secretary for North Carolina, received a special prize for the splendid

results he obtained in his state—18 new members, an increase of 60 per cent.

APPLICATIONS FOR MEMBERSHIP

See November, 1927, JOURNAL
FIRST LISTING

KIRKWOOD, GLENN B.	4130 Carolin St., Long Island City, N. Y.
	D. V. M., Kansas State Agricultural College, 1923
Vouchers:	D. A. Yandell and L. W. Goodman.
LEE, C. L.	Iola, Wis.
	D. V. M., Chicago Veterinary College, 1918
Vouchers:	James S. Healy and V. S. Larson.
LEE, CHESTER D.	Iowa State College, Ames, Iowa
	D. V. M., Iowa State College, 1927
Vouchers:	C. H. Covault and W. F. Guard.
MINSHALL, GEORGE W.	Viroqua, Wis.
	M. D. C., Chicago Veterinary College, 1904
Vouchers:	V. S. Larson and James S. Healy.
MOYLE, ISAAC WILLIAM	Big Bend, Wis.
	D. V. M., McKillip Veterinary College, 1907
Vouchers:	James S. Healy and V. S. Larson.
PATTERSON, CLEMENT H.	Tiskilwa, Ill.
	D. V. M., Iowa State College, 1926
Vouchers:	E. A. Benbrook and W. F. Guard.
SCHILLING, SAMUEL JAMES	Univ. of Arkansas, Fayetteville, Ark.
	D. V. M., Ohio State University, 1917
Vouchers:	Wm. L. Bleeker and H. Preston Hoskins.
STRINGHAM, GEORGE LAUDER	Wappingers Falls, N. Y.
	D. V. M., Cornell University, 1924
Vouchers:	C. E. Hayden and George A. Knapp.
WRIGHT, LEON M.	506 Elm St., Watertown, Wis.
	M. D. C., Chicago Veterinary College, 1909
Vouchers:	W. L. Bolin and J. P. West.

Applications Pending

SECOND LISTING

Burris, Thomas B., 3684 Beverly Blvd., Los Angeles, Calif.
Cleaves, Aug. S., Gardner, Mass.
Donovan, Leo T., 17 Fond du Lac St., Waupun, Wis.
Evans, William Morris, 497 Huntington Ave., Boston, Mass.
Ferguson, Stanley Eugene, 421 Broad St., Lake Geneva, Wis.
Fuller, Jack Glendon, c/o The Surgeon General, Washington, D. C.
Hillenbrand, Charles B., Germantown, Wis.
Johnson, Olie N., 230 E. Washington St., Appleton, Wis.
Knilans, Arthur J., 733 Fifth Ave., Janesville, Wis.
Neely, Odie B., 517 Walnut St., Chattanooga, Tenn.
Nye, Elwood L., c/o Surgeon General's Office, Washington, D. C.
Parker, Bailey Rufus, 224 Fremont St., Whitewater, Wis.
Russell, Arthur B., 624 Church St., Beloit, Wis.
Sager, Floyd Chauncey, Army Vet. School, Army Med. Center, Washington, D. C.
Stack, John Henry, 1419 Bellevue Ave., Syracuse, N. Y.
Stueland, Lincoln A., 50 E. Buchtel Ave., Akron, Ohio.

The amount that shall accompany an application filed this month is \$5.42, which covers membership fee and dues to January 1, 1928, including subscription to the JOURNAL.

COMING VETERINARY MEETINGS

- U. S. Live Stock Sanitary Association. La Salle Hotel, Chicago, Ill. Nov. 30, Dec. 1-2, 1927. Dr. O. E. Dyson, Secretary, Live Stock Exch. Bldg., Wichita, Kans.
- Central Michigan Veterinary Medical Society. Otsego Hotel, Jackson, Mich. Dec. 7, 1927. Dr. W. N. Armstrong, Secretary, Concord, Mich.
- New York City, Veterinary Medical Association. Academy of Medicine, 5th Ave. & 103rd St., New York, N. Y. Dec. 7, 1927. Dr. C. P. Zepp, Secretary, 128 W. 53rd St., New York, N. Y.
- Western New York Veterinary Medical Association. Buffalo, N. Y. Dec. 8, 1927. Dr. F. F. Fehr, Secretary, 243 S. Elmwood Ave., Buffalo, N. Y.
- Nebraska State Veterinary Medical Association. Lincoln, Nebr. Dec. 13-14, 1927. Dr. Geo. A. Young, Secretary, Syracuse, Nebr.
- Southeastern Michigan Veterinary Medical Association. Detroit Mich. Dec. 14, 1927. Dr. H. Preston Hoskins, Secretary, 716 Book Bldg., Detroit, Mich.
- California State Veterinary Medical Association and University of California Veterinary Conference. University Farm, Davis, Calif. Jan. 3-4-5, 1928. Dr. W. L. Curtis, Secretary, 1264 W. 2nd St., Los Angeles, Calif.
- Pennsylvania, Conference of Veterinarians, University of Philadelphia, Pa. Jan. 4-5, 1928. Dr. Louis A. Klein, Dean, 39th St. & Woodland Ave., Philadelphia, Pa.
- Kansas Veterinary Medical Association. Wichita, Kans. Jan. 4-5, 1928. Dr. Chas. W. Bower, Secretary, 1128 Kansas Ave., Topeka, Kans.
- Wisconsin Veterinary Medical Association. Madison, Wis. Jan. 9-10-11-12, 1928. Dr. B. A. Beach, Secretary, University of Wisconsin, Madison, Wis.
- Intermountain Livestock Sanitary Association. Ogden, Utah. Jan. 10-11, 1928. Dr. W. D. Wright, Secretary, 312 Federal Bldg., Ogden, Utah.
- Ohio State Veterinary Medical Association. Deshler-Wallick Hotel, Columbus, Ohio. Jan. 11-12, 1928. Dr. W. R. Hobbs, Secretary, Ohio State University, Columbus, Ohio.
- Virginia State Veterinary Medical Association. Richmond, Va. Jan. 12, 1928. Dr. Geo. C. Faville, Secretary, Hampton Institute, Hampton, Va.

- Minnesota State Veterinary Medical Association. Minneapolis, Minn. Jan. 12-13, 1928. Dr. C. P. Fitch, Secretary, University Farm, St. Paul, Minn.
- Cornell University, Twentieth Annual Conference for Veterinarians at. Ithaca, N. Y. Jan. 12-13, 1928. Dr. V. A. Moore, Dean, N. Y. State Veterinary College, Ithaca, N. Y.
- Indiana Veterinary Medical Association. Indianapolis, Ind. Jan. 17-18-19, 1928. Dr. R. H. Boyd, Secretary, 1422 N. Capitol Ave., Indianapolis, Ind.
- Iowa Veterinary Association. Savery Hotel, Des Moines, Iowa. Jan. 17-18-19-20, 1928. Dr. C. J. Scott, Secretary, Knoxville, Iowa.
- Colorado Veterinary Medical Association. Denver, Colo. Jan. 18, 1928. Dr. R. F. Bourne, Secretary, Fort Collins, Colo.
- Michigan State College Short Course for Veterinarians. East Lansing, Mich. Jan 23-24-25-26-27, 1928. Dr. Ward Giltner, Dean, East Lansing, Mich
- Missouri, Short Course for Veterinarians, University of. Columbia, Mo. Jan. 24-25-26-27, 1928.
- South Dakota Veterinary Medical Association. Cataract Hotel, Sioux Falls, S. Dak. Jan. 25-26, 1928. Dr. Ben Anderson, Secretary, Canton, S. Dak.
- Oklahoma State Veterinary Medical Association and Southwestern Tuberculosis Conference. Huckins Hotel, Oklahoma City, Okla. Feb. 6-7-8, 1928. Dr. C. H. Fauks, Secretary, 1919 W. Ash St., Oklahoma City, Okla.

STATE BOARD EXAMINATIONS

- Florida State Board of Veterinary Examiners. Gainesville, Fla. Jan. 9-10, 1928. Dr. A. L. Shealy, Secretary, University of Florida, Gainesville, Fla.

SOUTHWESTERN TUBERCULOSIS CONFERENCE

It has been found desirable to change the meeting place of the first Southwestern Tuberculosis Conference, announced in the November issue of the JOURNAL (pp. 268-269), from Tulsa to Oklahoma City, according to information received from Dr. C. H. Fauks, Secretary. The dates remain unchanged, February 6-7-8, 1928. The conference will be a joint meeting with the Oklahoma State Veterinary Medical Association and all sessions will be held at the Huckins Hotel, Oklahoma City.

THE CORPUS LUTEUM OF PREGNANCY IN THE DOMESTIC COW (*BOS TAURUS*) AND A BRIEF DISCUSSION OF CYCLICAL OVARIAN CHANGES*

By G. W. McNUTT, Ames, Iowa

Department of Veterinary Anatomy
Iowa State College

Novak and Te Linde¹⁷ in their pathological study of the corpus luteum in women state: "A *sine qua non* in the study of the pathological anatomy of the corpus luteum is a knowledge of the normal life cycle of this structure—its histogenesis, its cyclical variations, and its manner of retrogression." The more we read in veterinary literature concerning this subject the more forceful does the truth of this statement become. In this, and an article previously published,¹⁸ it is hoped to cover the normal life cycle of the corpus luteum in the domestic cow.

MATERIAL AND METHODS

This study has covered a period of about eight years, during which many trips were made to different packing-plants and gross observations made on several thousand specimens while collecting ovaries for gland-extract work. Rectal palpations have been made to determine the condition of the ovaries and fate of the corpus luteum following parturition. In addition to this a microscopic study has been made on thirty-two corpora lutea taken from pregnant cows or from cows shortly following parturition. The earliest of these corpora lutea was obtained from a cow pregnant twenty-one days. The remainder were taken at regular intervals throughout pregnancy, as indicated by the length of feti removed from the uterus. The usual routine was to fix one piece of each corpus luteum in Flemming's fluid and one piece in Bouin's fluid. The sections from Flemming's fluid were examined without further stain, while those from Bouin's fluid were usually stained with chloral hematoxylin followed by picric acid-fuchsin. Special stains were used in some cases:

GROSS DISCUSSION

In pregnancy the corpus luteum is generally retained in the ovary until the termination of gestation. In some instances

*Presented at the thirty-ninth annual meeting of the Iowa Veterinary Association, Des Moines, January 18-21, 1927.

the corpus luteum is not retained but undergoes marked retrogression and decrease in size during the latter half of pregnancy. Such cases are not uncommonly met with in packing-house material.

Much has been said concerning the differences between the corpus luteum of oestrus and that of pregnancy in the cow. Williams²² tells us that the corpus luteum of the non-pregnant cow is chocolate or liver-colored, while that of pregnancy is yellow. We have found the corpus luteum of the non-pregnant animal on carefully timed material also to be yellow or a brownish yellow. Thousands of corpora lutea have been examined from both pregnant and non-pregnant cows and but one was found that was liver-colored. This was from a cow pregnant about six months and had undergone marked retrogression.

Elder¹ states that the corpus luteum of pregnancy is slightly larger than that of the non-pregnant animal. When we analyze Elder's work we find:

1. His non-pregnant cases were not timed. A number of them were unquestionably either developing or retrogressing and would naturally be smaller.

2. Most of his non-pregnant corpora lutea showed degenerative changes, which proves them not at the height of their development.

3. Fifty per cent of his non-pregnant cases were young heifers, in which the corpus luteum is smaller than in older animals.

4. The number of animals was too small from which to draw conclusions.

I have been trying for several years to find a means of telling the fully developed corpus luteum of the non-pregnant animal from that of the pregnant one and have come to the conclusion that there is no gross means of doing this except the presence or absence of a fetus in the uterus. As a rule, however, the corpus luteum of pregnancy is covered by a heavier tunic and the protuberance, when present, is less pronounced. Nothing of value has been determined from measurements of several hundred corpora lutea from both open and pregnant cows. Care was taken to measure corpora lutea in only those cases of open cows which could be placed in about the middle of the cycle according to our previously published data.^{13,16}

Variation in size of corpora lutea is very marked, both in non-pregnant cows and in pregnant ones. By taking an average, no noticeable difference in the two classes was apparent. In

studying size of corpora lutea of pregnancy there again the variation was so great that it could not be said there was any gross change in different stages of pregnancy. It has frequently been said that the corpus luteum gradually decreases in size as pregnancy advances but our records do not bear this out. Two of the largest corpora lutea measured were from cows in their eighth and ninth months of pregnancy, respectively.

Kupfer¹² also was unable to detect any increase in size of the corpus luteum in the pregnant cow over that of the non-pregnant one.

MICROSCOPIC DISCUSSION

The manner of development of the corpus luteum, both gross and microscopic, has been described in our previous article and will not be repeated here. The cytology of the lutein cells has also been given. Hence the microscopic discussion given here will be in the form of a comparison of the corpus luteum of pregnancy with the corpus luteum in the non-pregnant cow.

In early pregnancy the lutein cells are, as a rule, well preserved and show an oval granular nucleus (figs. 7 and 9). Occasionally a cell can be seen showing signs of retrogression. With Flemming's fixation these cells frequently show an endoplasm laden with large lipoid granules (fig. 1). The total amount of lipoid does not differ materially between the corpus luteum of a 21-day pregnant animal and the 10½-day corpus luteum of the non-pregnant animal (compare figs. 3 and 4). The distribution of lipoid differs somewhat, due to the fact that certain cells show fatty retrogressive changes in early pregnancy. As stated above, the lipoid granules in the non-pregnant state are more uniform in size (fig. 2).

A gradual retrogression and complete destruction of certain lutein cells is seen throughout pregnancy but is not marked during the first half of this period. When the fetus has reached a length of 40 cm., crown-rump measurement (five and one-half months), retrogressive changes are readily noticeable in all the lutein cells. They no longer show the clear distinct cell structure previously seen (fig. 10). These changes continue very gradually throughout the remainder of pregnancy and are quite marked toward the end of the term (fig. 8). The lipoid content of the corpus luteum decreases as pregnancy advances, more lipoid being seen during the early stages (figs. 3, 5 and 6).

This retrogressive change, seen following the fifth month of

pregnancy, is very slow and is not accompanied by any marked decrease in size of the cells nor decrease in size of the corpus luteum as a whole. These changes may indicate that the corpus luteum has practically ceased to function during the latter half of pregnancy.

Delestre³ states that degenerative histological changes are seen following the fifth month of pregnancy in the cow and gives a description which corresponds quite closely with our own findings.

Retrogressive changes marked by disintegration and absorption of the lutein cells are marked following parturition. Forty-eight hours after parturition the corpus luteum has decreased slightly in size; following this period it decreases quite rapidly in size so that by the sixth day it is palpable per rectum as a small firm body about one-half to one-fourth its former size. While only a few cases have been available for the microscopic study of retrogression following parturition, yet these clearly indicate that there is essentially no difference in the manner of their retrogression and that already described in the non-pregnant cow.¹³ Fatty changes are manifest by an increase in number and size of granules. The majority of the lutein cells disintegrate and are absorbed but some persist and are transformed into pigment cells, thus forming the true corpus rubrum of the cow's ovary.

CYCCLICAL FOLLICULAR CHANGES

Cystic conditions of the ovary and corpus luteum have been a cause of great confusion among veterinarians generally. Therefore a brief discussion of the cyclical changes in the ovary and an effort to determine where we can draw the line between the physiological limit and the pathological conditions will not be amiss here. It is not my intention to discuss the pathology of the ovary but rather to discuss anatomical and physiological aspects, which must be thoroughly understood in order to appreciate or even determine the pathological state.

Let us first make a few statements concerning ovarian follicles. Small follicles first start to develop during fetal life. These eventually all become atretic and disappear (Van Beek). A new set of follicles is formed toward the end of fetal life. Certain of these, probably those most favorably situated with regard to blood supply, are constantly developing and then becoming atretic from birth to sexual maturity. These follicles are quite small in a new-born calf but their maximum size

gradually becomes larger as the animal becomes older. In a six- or eight-months-old heifer calf, the ovaries may contain two or three dozen follicles, ranging in size from 2 to 15 or even 20 mm. This process of continuous development and atresia is continued throughout sexual maturity. The larger follicles in the non-pregnant animal follow cyclical changes. They usually develop to their greatest size during the latter half of the twenty-one-day cycle.

From one to four or even five follicles normally develop to their maximum size during heat. These follicles do not follow any definite routine manner of development. By rectal palpations carried out throughout the cycle, it can be determined that they start to enlarge in some cases before they do in others. In some instances they grow quite gradually, while in others they are not detectable until about the 19th or 20th day. In this case they grow very rapidly during heat. Ovulation takes place from 30 to 65 hours after the onset of heat or the day following the heat period. Follicles rupture when they have reached a diameter of anywhere from 10 to 19 or 20 mm. Usually only one of the follicles which develop preceding a heat period ever reaches terminal growth or maturity and ruptures. At the time of ovulation, or just before this, the other large follicles become atretic and are quickly resorbed. No large follicles are ever normally carried from one heat period to the next. It is not uncommon to have two or even three follicles rupture at one heat period, frequently resulting in twins or triplets in case pregnancy follows.

Ovarian follicles develop and become atretic throughout pregnancy the same as at other times during sexual life. It is not uncommon in pregnant animals, particularly during the first half of pregnancy, to find several follicles in one or both ovaries ranging from 10 to 20 mm. in size. These follicles represent a normal physiological process in pregnant cows. In late pregnancy large follicles are seldom found in the ovaries. In cows approaching the end of term I have not found any large follicles in the ovaries. Following parturition the ovaries are very small, due to retrogression of the corpus luteum and a lack of development of ovarian follicles. A sufficient number of cows has not been examined following parturition to state definitely at what time large follicles again begin forming. One cow was followed for 30 days after parturition and no follicles large enough to palpate appeared in the ovaries during this time. Kupfer states

that the cow ovulates 16 to 21 days after calving.

Ovulation occurs only following a heat period and does not take place during pregnancy. Occasionally a cow is found which manifests heat during pregnancy (Covault). To date we have been unable to examine ovaries from such cases and are therefore unable to state what ovarian changes take place.

CYSTIC CONDITIONS

Papanicolaou¹⁸ states that ovarian cysts may be the result of overgrowth of the embryological remains of the Wolffian duct system, a part of which persists in a rudimentary form within the ovaries of mammals. We have found an embryonic vestige, in the ovary of a cow, which appears as a narrow yellow cord extending from the hilus a variable distance into the medulla. Histologically it appears as if composed of glandular tubules lined by cuboidal epithelium. From my own observations I would judge that this vestige is not a common cause of ovarian cysts in the cow, although further study on this point is necessary.

The vast majority of cysts in the ovaries appear to be due to an abnormal condition of the ovarian follicles. These may be manifest either by an abnormal number or by an abnormal size. Small fluctuating bodies in the ovaries, 20 mm. or less in diameter, are not cysts but normal ovarian follicles. The only case in which such bodies may be considered cysts is when they are present in immense numbers resulting in a greatly enlarged organ. In cases of nymphomania history may be indicative. My study of ovarian follicles is not completed but it tends to show that the majority of the follicles in the ovary, 2 mm. or larger, are in a state of atresia. This will probably vary somewhat with stages of the cycle but it plainly indicates that we are not safe in stating that a follicle of 15 or 20 mm. in size is a cyst, simply because it does not show the various parts of the follicular wall in a good state of preservation.

In discussing cysts of the corpus luteum we can do no better than to repeat Novak and TeLinde's¹⁷ classification concerning physiological and pathological variations.

- I. Normal cycle:
 - (a) Stage of proliferation
 - (b) Stage of vascularization
 - (c) Stage of retrogression.
- II. Physiological variations:
 - (a) Cystic form
 - (b) Hemorrhagic form
 - (c) Corpus luteum of pregnancy (cystic and solid).
- III. Pathological variations:
 - (a) Corpus luteum abscesses

- (b) Corpus luteum cysts: (1) recent, (2) old
- (c) Corpus luteum hematoma: (1) recent, (2) old
- (d) Corpus albicans cyst
- (e) Corpus albicans hematoma
- (f) Combined types
- (g) Corpus luteum neoplasm (luteoma).

IV. Allied conditions—multiple lutein cysts of the ovary.

Let us note that the physiological variations include cystic forms both during the cycle and during pregnancy.

After carefully studying both the gross and microscopic development of the corpus luteum, I am inclined to believe that cysts in this structure are formed during its development. Cysts formed after the corpus luteum has been completely formed are of very rare occurrence. In 52 follicles examined within a few hours after rupture had occurred, a blood clot was found in only two cases. The clot in one was 12 mm. in diameter and in the other 4 mm. In four cases a redistention of the cavity with a straw-colored fluid had taken place and in one case, which appeared as a redistention, the fluid was between the granulosa and the theca interna. In the 45 other cases the walls of the follicle were thrown into deep folds and practically no fluid was found in the central cavity. A study of several hundred young corpora lutea, ranging from one to four days following ovulation, revealed no indications of a blood clot ever having formed in the antrum of the former follicles, but a small amount of hemorrhage was common at the point of rupture and into the follicular wall. It gave a reddish color to the developing corpus luteum, particularly in its outer part. Redistention of the antrum following ovulation is not the rule in the cow, but not infrequently occurs. When we realize that the theca interna of the follicle contains a rich network of capillaries which are engorged with blood at the time ovulation takes place, it would seem logical that injury to these capillaries would occur when the follicle bursts and collapses. Hence it would seem that probably this fluid found following such a rapid distention of the follicle is little more than extravasated lymph.

A study of progressive stages of development in follicles in which an appreciable amount of fluid is found in the antrum following ovulation reveals that it is not readily resorbed but that a connective tissue wall is thrown around it, the corpus luteum developing outside this wall. A very large majority of these cysts are physiological, as they are not large enough to interfere with the normal function and life span of the corpus luteum. Occasionally one is met with which is large enough to

interfere, so must be classed as pathological. Cysts of this type frequently become quite large, have a thin wall, fluctuate freely and there is but a thin shell of lutein tissue around them.

The cysts found by Elder⁴ in his work on the cow and discussed under the heading of "Cystic Degeneration of the Corpus Luteum" in all probability should be classed as physiological cysts. Boyd¹ pictures a small, well-encapsulated cyst in the corpus luteum of the cow and labels it "the beginning of cyst formation," which, in my opinion, represents the end of cyst formation. If all of this type of cysts found in the corpora lutea were simply beginning to form, we would indeed have a problem in sterility in cattle far worse than the one we are facing today.

SUMMARY

The corpus luteum of pregnancy does not differ materially from the fully developed corpus luteum of the non-pregnant cow, as far as gross appearance is concerned. Measurements of the two have revealed nothing of value.

Microscopically a retrogressive cellular change is seen following the fifth month of gestation. This retrogression is very slow and is not accompanied by any marked decrease in size of the corpus luteum as a whole until after parturition. Retrogressive changes, both gross and microscopic, are rapid following parturition, the corpus luteum being reduced to one-half to one-fourth its former size by the sixth day. No reason was found for believing retrogression following parturition differs in any way from that already described for the corpus luteum of non-pregnant cows.

A brief discussion is given concerning the development of ovarian follicles and their cyclical changes and cystic conditions in the ovaries.

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INDEX TO FIGURES

- FIG. 1. Photomicrograph of corpus luteum from cow carrying a 6-mm. fetus; about 25 days pregnant (Ac. No. 101). Flemming's fixation without further stain. $\times 900$. Note the irregular size of the lipoid granules. One cell in the middle of the photograph is filled with large granules (retrogression). Small cells are occasionally seen throughout pregnancy.
- FIG. 2. Corpus luteum from non-pregnant cow, $10\frac{1}{2}$ days after onset of heat (Ac. No. 66). Flemming's fixation without further stain. $\times 900$. The lipoid granules are of uniform size.
- FIG. 3. Same as fig. 1, but low magnification.
- FIG. 4. Same as fig. 2. $\times 100$.
- FIG. 5. Corpus luteum from a cow carrying a 57-cm. fetus; pregnant about 6 months (Ac. No. 27). Flemming's fixation without further stain. $\times 100$. Note the marked decrease in lipoid when compared with fig. 3, taken during early pregnancy.
- FIG. 6. Corpus luteum from a cow carrying an 85-cm. fetus; near end of term (Ac. No. 21). Flemming's fixation without further stain. $\times 100$.
- FIG. 7. Corpus luteum from a cow pregnant 21 days (Ac. No. 81). Bouin's fixation, chloral hematoxylin, picric acid-fuchsin stain. $\times 400$.
- FIG. 8. Same tissue as fig. 7. Bouin's fixation, chloral hematoxylin, picric acid-fuchsin stain. $\times 400$. Note the decided retrogression when compared with fig. 7. Several areas show nothing but a disintegrated mass with an occasional nucleus.
- FIG. 9. Corpus luteum from a cow pregnant 32 days; 10-mm. fetus (Ac. No. 80). Bouin's fixation, chloral hematoxylin, picric acid-fuchsin stain. $\times 100$.
- FIG. 10. Corpus luteum from a cow carrying a 40-cm. fetus, pregnant about $5\frac{1}{2}$ months (Ac. No. 85). Bouin's fixation, chloral hematoxylin, picric acid-fuchsin stain. $\times 100$. The same care was used in preparation and photographing this tissue as in fig. 9, hence the difference in appearance is not due to faulty technic but to retrogressive changes in the lutein cells. All corpora lutea examined, from this stage on, showed progressive changes similar to those illustrated here.



FIG. 2.

FIG. 1.



FIG. 3.

FIG. 4.

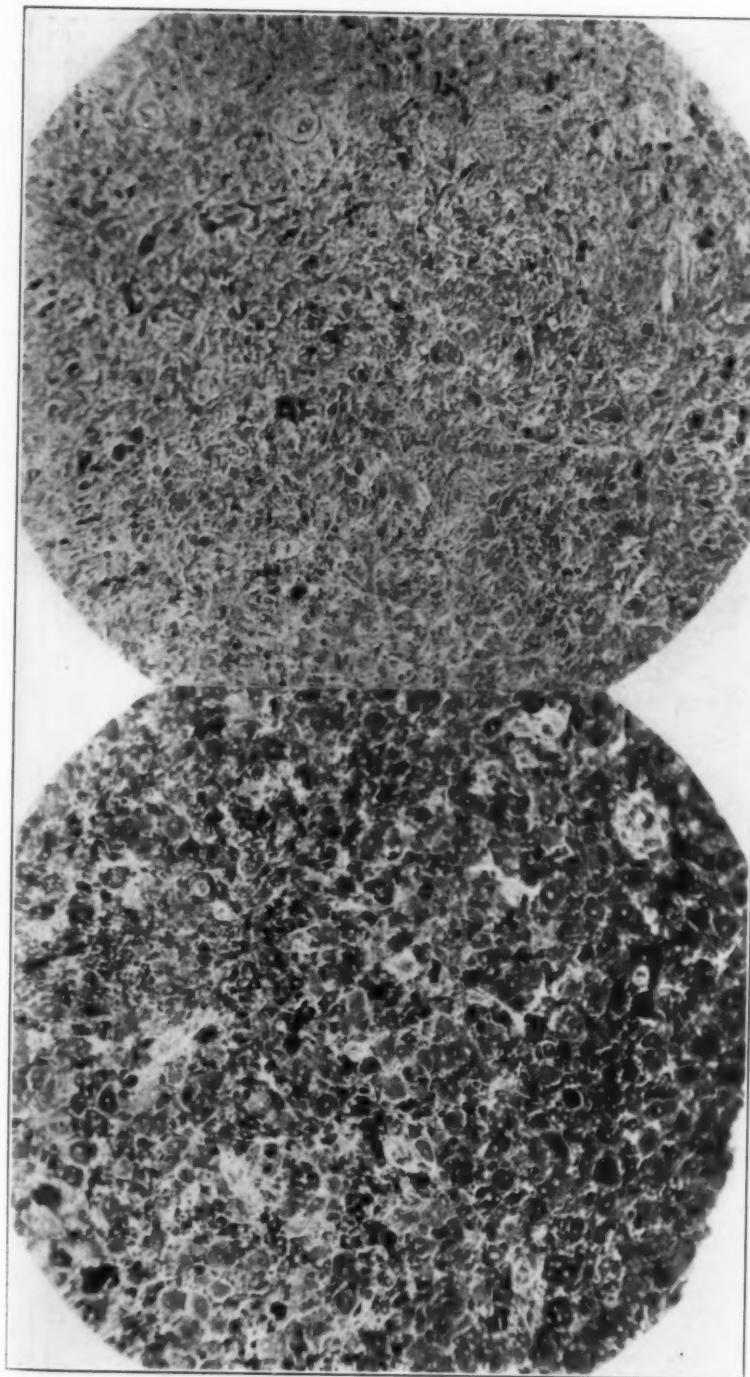


FIG. 6.

FIG. 5.

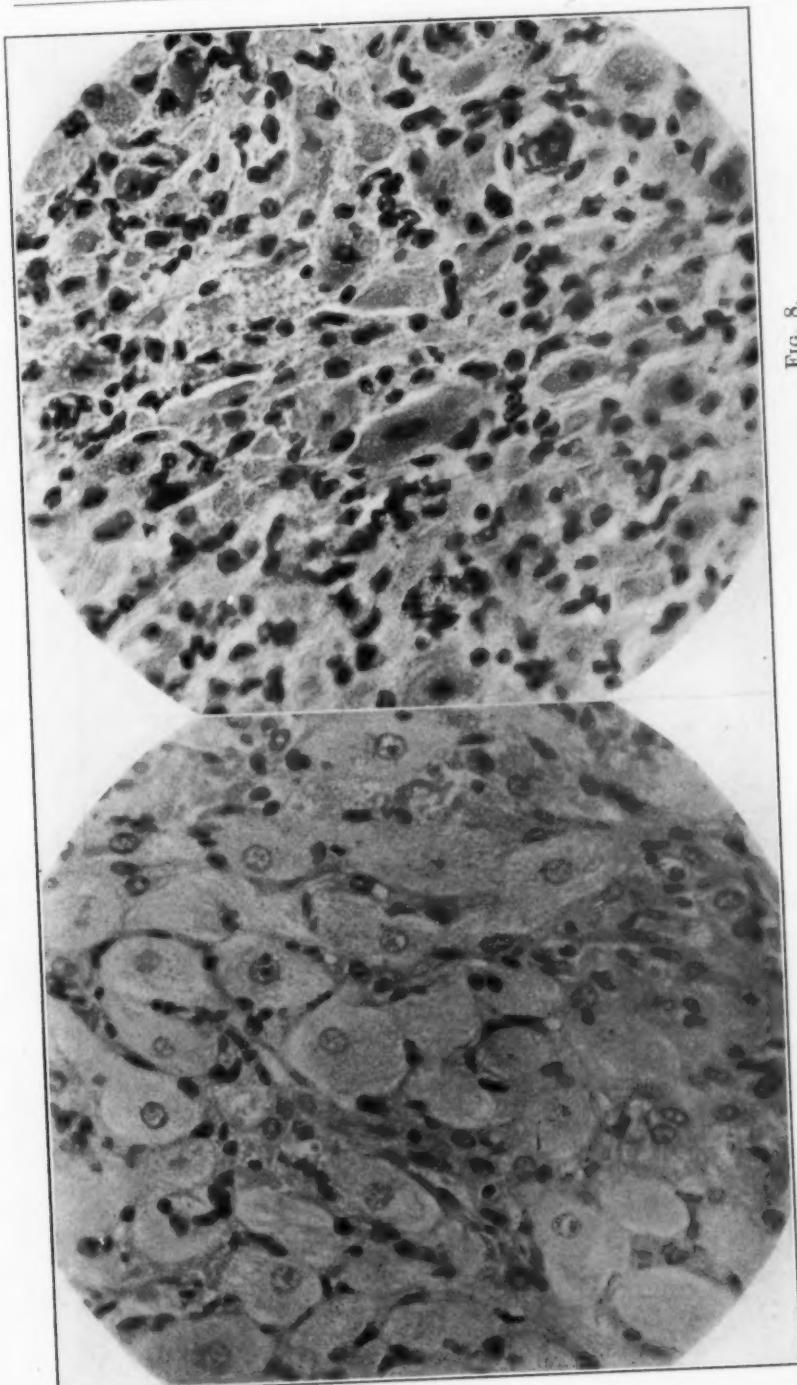


FIG. 7.

FIG. 8.



FIG. 10.

FIG. 9.

THE PRODUCTION OF A STERILE ANTHRAX ANTIGEN IN VITRO*†

By S. J. SCHILLING, *Fayetteville, Ark.*

Experiment Station, College of Agriculture, University of Arkansas

Two of the outstanding problems in the immunization against anthrax are to make the means employed more uniformly efficacious and to develop an immunizing agent the use of which is free from danger. The Pasteur vaccine appears to induce sufficient protection in treated animals in many districts. In other districts serious losses of farm animals are experienced even though such animals have been vaccinated. To meet this situation vaccines have been introduced in which the anthrax spores are more virulent and which are designed to be given in a longer series of treatments. Records on the use of these vaccines in the field do not clearly indicate that the stronger vaccines have reduced the mortality of farm animals in subsequent outbreaks. They do, however, indicate that there has been an increase in cases of vaccination anthrax.

The occurrence of vaccination anthrax and the extension of infected areas through the introduction of more or less attenuated spore vaccines are sources of danger in the use of this type of immunizing agent. The development of an anti-anthrax antigen which does not contain any living virus, providing that such proved also to be efficacious, would be of immense value in the control of this disease. This paper reports experimental work on the preparation of substances capable of inducing protection against anthrax and which are free from living organisms.

The materials used by other investigators who have sought to immunize animals against anthrax by means of sterile antigenic substances resolve themselves into several classes:

- (1) Suspensions and extracts of dead anthrax bacilli which had been cultivated on artificial media.
- (2) Artificial culture media in which anthrax bacilli had been cultivated and from which they later were removed.
- (3) Tissue extracts and body fluids from cases of anthrax.
- (4) Filtrates of anthrax cultures grown in relatively unaltered body-fluids.

*Research paper No. 71, Journal Series, University of Arkansas.

†Part of the data herein presented was obtained in the laboratories of the Department of Bacteriology, Ohio State University, and was submitted as a thesis contributing to fulfilment of the requirements for the degree of Master of Science. Received for publication, June 25, 1927.

The first two classes of substances noted above probably are low if not devoid (at least in the form in which they have heretofore been employed) of value as immunizing agents.

Woolridge¹ reported positive results in attempts to immunize rabbits with the boiled and filtered culture medium when *B. anthracis* was grown in an alkali extract of calf thymus and testicle. Sobernheim² properly criticizes this work by calling attention to the fact that Woolridge used guinea pigs as controls, which fact naturally prevents proper evaluation of the results.

Brieger, Kitasato and Wassermann,³ who used similar extracts of thymus, fish sperm and lymph-glands for the cultivation of *B. anthracis*, after which the media were sterilized by heating to 100° C. for ten minutes, obtained negative results in attempts to immunize white mice and guinea pigs. Likewise the researches of Maltsew,⁴ of Casagrandi,⁵ and of Dawson,⁶ who used filtrates of cultures which were essentially bouillon media, and of Dawson,⁶ using suspensions and extracts of dead anthrax bacilli, were not rewarded by positive results.

Arloing⁷ also was unable to induce immunity in experiment animals when he used as antigen the filtrates of bouillon cultures of *B. anthracis* which had passed through a Chamberland filter. When, however, he permitted such cultures to stand in a tall vessel and siphoned off the supernatant fluid, drawing it through a small pledge of cotton, he recovered part of the culture fluid with which he was able to immunize animals.

Arloing concluded, therefore, that antigenic substances are produced by *B. anthracis* cultivated in bouillon but that these substances did not pass through the pores of filter candles. His work, however, has had no confirmation.

The other classes of sterile antigenic materials used in previous investigations quite regularly were found to be more or less efficacious and to induce protection against anthrax in the treated animal.

Toussaint⁸ succeeded in immunizing animals against anthrax by infecting them with blood from animals which had died from anthrax; the blood was heated for 10 minutes at 55° C. before being used. Roux and Chamberland,⁹ in investigating this method of immunization found: that heating for 10 minutes at 55° C. did not kill all anthrax bacilli present in the blood; that when such blood or anthrax spleen extracts were heated at 100-115° C. the organisms were killed but the material was devoid of immunizing action on sheep; and, that such blood sealed in tubes and heated at 55° C. for one hour on five consecutive days was sterile and could be used with some success in immunizing sheep. Sobernheim,² in reviewing this topic, thus draws an unwarranted conclusion when he implies that the sterilization of the blood results in loss of its antigenic quality; for, when the blood of animals dead from anthrax was sterilized but not heated to excessively high degrees of temperature its potency was not destroyed.

Musio⁴ (1898) extracted an immunizing substance from the livers, spleens, and edematous fluids of rabbits dead from anthrax. Wernicke⁴ succeeded in similar work in using extracts of the spleens of guinea pigs which had succumbed to that disease. De Christmas⁴ reports positive results in immunizing rabbits against anthrax by means of the blood and organ extracts of animals dead of anthrax; these materials were sterilized by the addition of eucalyptus oil. Casagrandi⁵ secured tissue juices from the internal organs of animals dead from anthrax by subjecting the tissues to a pressure of 400 atmospheres and then extracting the residual solids with a physiological salt solution. These extracts lent themselves to the immunization of rabbits and sheep but not of guinea pigs, and

Casagrandi was led to conceive that their antigenic quality was derived in part from the nucleohistones of animal tissue and in part from the nucleoproteids of anthrax bacilli.

Bail¹⁰ reported that the blood-serum and the intraperitoneal, intrapleural and subcutaneous exudates which may be recovered from animals dead from anthrax, when freed from living organisms by centrifuging or by addition of toluol, were capable, on experiment animals, of inducing marked increase in resistance to infection by *B. anthracis*. Bail found the subcutaneous exudates richest in antigenic quality. Later Okunda¹¹ and still more recently Matsumoto¹² have published results of experimental work in which edematous fluids from cases of anthrax served to immunize other animals.

While there is a general agreement among research workers regarding the observation that the blood, tissue juices, and exudates from animals which have died from anthrax possess an antigenic quality which may be made to serve in inducing a considerable degree of active immunity in treated animals, no single explanation of the process or of the substances involved has been universally accepted. This question has been the subject of much controversy. Wassermann and Citron¹³ and others, after extended researches, concluded that the antigenic effect of such fluids is analogous to extracts of bacilli which may be secured from artificial culture media and is dependent upon exo- or endo-toxins extracted from the bacilli. Bail¹⁴ suggests, however, that the antigen contained in blood and exudates from cases of anthrax is a specific secretion of the invading organism—an "aggressin"—by means of which the anthrax bacillus paralyzes the defensive mechanism of the body and thus is aided in its attack. This theory has not met with acceptance in all quarters.

Again, filtrates of anthrax cultures grown in oxalated blood plasma and in alkali albuminates induced immunity in rabbits as reported by Casagrandi.⁵ The results of work with the filtrates of blood-plasma cultures are of particular interest because of the close similarity of this material to some of the materials used in the work herein reported.

The experimental results here referred to justify certain inferences to serve as the basis for further inquiry into the production of antigenic substances for anthrax.

The anthrax bacillus, when multiplying in the animal body, apparently produces a substance which tends to immunize the animal, as may be noted when attenuated organisms in the form of anthrax vaccine are utilized; a certain grade of infection, i. e., the local reaction, appears in fact to be necessary for obtaining fortified resistance. Moreover, the anthrax bacillus, when multiplying in the animal body and causing a lethal infection, also appears to produce antigenic substances there which may be recovered and may be used for the active immunization of other animals. Again, the work of Casagrandi⁵ would indicate that the anthrax bacillus, when cultivated in the presence of body fluids which had undergone no radical change, will there produce antigenic substances.

On the other hand antigenic substances appear to be wanting in cultures of *B. anthracis* in artificial media. Thus, it is conceivable that the stimulus for the production of immunizing antigen is dependent upon some quality of animal tissue or of

the body fluids of the animal organism. Ordinary culture media, such as bouillon, with which, as previously stated, experiments on the production of antigen have in general been inconclusive or unsuccessful, contain tissue extracts; but in the process of preparing and of sterilizing them gross chemical changes occur so that they do not closely simulate the fluids found in protoplasm.

The following experimental work was designed to secure several types of culture media which would be composed of, or would contain, normal tissue or body fluids which had been handled in a manner to preserve best their original characteristics. Such media were then heavily inoculated with *B. anthracis* and incubated, after which the organisms were removed by filtration and the filtrates tested for antigenic qualities by inoculation into rabbits. Appropriate tests were also conducted on guinea pigs to determine whether the filtrates contained toxins, or substances which, like Bail's "aggressin," would promote the course of an infection.

Some additional work was done to test the toxicity and disease-promoting power of a *B. anthracis* bacterin when the same was injected into guinea pigs, with and without simultaneous infection with virulent cultures.

PREPARATION OF ANTHRAX CULTURE FILTRATES AND OF BACTERIN

Five types of media were utilized in this work. They were (1) blood-serum; (2) milk-serum; (3) egg extract in normal salt; (4) fresh sterile tissue in 1% peptone solution; 1% peptone solution.

Blood-serum: A quantity of bovine blood was collected and permitted to clot. The clot was detached from the walls of the containers and after twelve hours of refrigeration the serum was poured off and immediately passed through a Berkefeld filter. The filtrate was collected in sterile flasks and tested for sterility by plating several 1-cc quantities in agar. The filtrate and the plates were incubated 48 hours; no bacterial growth was noted.

In further investigations on blood-serum culture filtrates equine blood was used. After filtration of the fresh serum the same was divided into four quantities; three of these were diluted with previously sterilized Dunham's peptone solution so as to yield respectively 10%, 25%, and 50% equine serum in peptone solution and the fourth was left undiluted.

Milk-serum: Preliminary tests revealed that it required the addition of about 4 cc of 10% acetic acid to cause a fairly rapid coagulation of casein in whole milk heated to 37°C.; this treatment also resulted in the formation of a firm curd so that the milk-serum could be poured off and filtered through glass wool and a filtrate but slightly turbid would result. This procedure was adopted in securing milk-serum in which to grow *B. anthracis*. After filtration through glass wool the serum was titrated with N/20 NaOH, phenol red serving as the indicator; sufficient N/1 NaOH was then added to the filtrate to adjust the reaction of the serum to pH 7.0. The standardized milk-serum was then passed through a Berkefeld filter and the filtrate was placed in sterile flasks. Several 1-cc samples were then removed and plated and the filtrates and plates were incubated as a test for sterility of the filtrates. No evidence of contamination was observed.

Egg extract: Two eggs were broken into a tared beaker; the weight of the egg yolks and whites was found to be 96 gms. The eggs were thoroughly beaten; then with constant beating enough physiological salt solution was added to make 960 cc of fluid. On attempting to filter this through a 2" x 10" Mandler filter, tested not to pass air bubbles at 8 pounds pressure, no filtrate was secured even though 70 pounds pressure was applied.

Using the same procedure, a quantity of 1% and a quantity of 5% egg yolks and whites were prepared. It was found that the former could be filtered at 10 pounds and the latter at 30 pounds pressure. In the preparation of the filtrate used in the following experiments, a 5% egg solution was used in which the combined yolk and white of one egg which weighed 52 gms. were beaten and diluted with physiological salt solution to a volume of 1020 cc. Tests, as before, were conducted to determine whether the filtrate was sterile; no evidence of contamination was found.

Fresh, sterile tissue in peptone solution: A solution containing 1% Difco peptone and 0.5% NaCl in distilled water was prepared and 100 cc was placed in each of two 250-cc flasks; these were then sterilized. A guinea pig was killed and immediately autopsied, at which time the spleen was removed with aseptic precautions and was introduced into one flask containing peptone solution. A piece of liver about as large as the spleen was also carefully removed and placed in the other flask. These flasks were then incubated 24 hours, after which they were examined and 1-cc samples of the fluids removed for plating. Indications of contamination failed to appear.

Peptone solution: This solution contained 1 gram Difco peptone and 0.5 gm. NaCl in 100 cc distilled water. It was tubed in tubes containing 10 cc, the tubes were plugged and sterilized under pressure. After sterilization they were incubated to test for sterility.

The media consisting of bovine blood-serum, milk-serum, egg extract, and peptone solution with fresh tissue were then heavily inoculated with spores of a virulent culture of *B. anthracis* and incubated 48 hours at 37°C. The cultures were filtered separately through Berkefeld filters and the filtrates placed in sterile flasks. These filtrates were then tested for sterility by plating. Enough phenol was added to the filtrates to make a 0.5% solution and they were held in the refrigerator until used for animal inoculation.

The three quantities of diluted equine serum and the undiluted portion were also heavily inoculated with virulent anthrax spores and these were incubated at 37° C. for seven days. The cultures were agitated each day and observations were made on them. It was found that vegetative growth with capsule-formation occurred in each preparation; the amount of growth appeared to be inversely proportional to the concentration of equine serum. However, organisms growing in the 10 per cent equine-serum culture were not observed to show capsules as regularly as those growing in any of the media having a higher concentration of serum.

Laboratory facilities were not adequate to accommodate a test by animal inoculation of each of these cultures separately. Therefore, the 10% and 25% equine-serum cultures were combined, as were also the 50% and 100% equine-serum preparations. Each of these two quantities was then passed separately through filters and the filtrates were tested for sterility and preserved.

Three tubes of the peptone solution which had been tubed and sterilized under pressure were inoculated with spores of virulent *B. anthracis*. They were incubated 24 hours at 37° C., at which time three subcultures were made and enough phenol was added to the original peptone solution cultures to make a 0.5% solution. The phenolized tubes were heated at 55° C. for one hour, at which time one cubic centimeter was removed from each for plating. The plates and subcultures were incubated 24 hours at 37° C., when three further subcultures were made from the second set of tubes. This process of subculturing, phenolizing, heating

at 55° C. for one hour and plating was repeated five times, hoping to obtain a sterile suspension of young anthrax bacilli which had been treated with heat at temperatures customarily utilized in the preparation of bacterins. To the third, fourth, and fifth sets of subcultures enough phenol was added to make a 1% solution. The tests for sterility showed growth on all plates, indicating that *B. anthracis* had survived. Plates showed, however, that in all but two tubes of the third, fourth and fifth sets of subcultures, which were phenolized and heated to 55° C. for one hour on two successive days, sterility resulted. The sterile tubes were combined in a sterile flask and, on settling, enough of the supernatant fluid was poured off so that the bacteria which remained behind, when agitated, yielded a suspension of the density of tube 3, McFarland nephelometer. This suspension was preserved and used in experiments given below.

ANIMAL INOCULATIONS. TESTS FOR TOXICITY AND "AGGRESSIN" EFFECT

These tests were performed on guinea pigs and were made by injecting the filtrates and the sterile suspension of bacilli in controlled quantities into the peritoneal cavities of the test animals. Some of the animals received injections of filtrates or of bacterial suspension only; they served to test the toxicity of the materials used. Others received in addition a subcutaneous inoculation of a suspension of living anthrax spores; these served to determine whether the injection of filtrates or bacterial suspension would hasten the course of the infection as compared with control guinea pigs which received virulent cultures only. The procedure followed and the results obtained are summarized in table I. The virulent culture used was of the same strain of *B. anthracis* as used in the production of the filtrates and of the bacterin. For administration to animals reported on in table I, it was made up by inoculating 50 cc Dunham's peptone solution nine days previously. Prior to use for animal inoculation, the flask containing the culture was shaken vigorously in order to effect a fairly uniform distribution of the organisms and spores.

Following the injections the guinea pigs were kept under continuous observation for six hours; no effects of the treatment were observed. Beginning with the 44th hour after treatment, observations were made at maximum intervals of six hours until all animals which had received virulent cultures had succumbed.

At the 48th hour no evidence of illness was noticed in any of the animals. Without exception, however, the guinea pigs treated with virulent cultures presented swellings at the site of inoculation. These varied in extent as presented in table I. A single plus*mark (+) means an enlargement of about 1 cm. The largest swellings covered an area of about 2 x 3 inches and were about one-half inch thick at the centers. It was not possible to correlate the maximum or minimum extent of local disturbances

TABLE I—*Tests on guinea pigs of filtrates and sterile bacillary suspensions for toxic action*

G.P.	B. ANTHRACIS ANTIGEN	AMT. INJ. (CC)	VIRULENT CULTURE (CC)	WTS. (GMS.)	LOCAL EDEMA	GENERAL SYMPTOMS (HRS.)	DEAD (HRS.)
1	Filtrate	1.0	0.5	537	++	68	88
2	Fresh tissue	2.0	0.5	694	+++	68	78
3	in peptone	5.0	0.5	598	++++	50	52
4	solution	5.0	—	593	—	50	66
5	Filtrate	1.0	0.5	618	+++	60	66
6	Bovine blood-	2.0	0.5	596	++	60+	66
7	serum	5.0	0.5	567	+++	57	66
8		5.0	—	728	—	—	—
9	Filtrate	1.0	0.5	549	+++	50	54
10	Milk-serum	2.0	0.5	788	+	84	92
11		5.0	0.5	615	+++	72	88
12		5.0	—	545	—	—	—
13	Filtrate	1.0	0.5	490	+++	52	60
14	Egg extract	2.0	0.5	593	++	60	74
15		5.0	0.5	644	++++	52	57
16		5.0	—	758	—	—	—
17	Suspension	1.0	0.5	753	+++	57+	60
18	Dead	2.0	0.5	622	+	70	84
19	Bacilli	5.0	0.5	695	+++	57	66
20		5.0	—	412	—	—	—
21	Controls		0.5	614	+	50	60
22			0.5	608	+	92	96
23			0.5	698	++	70	74
24			0.5	606	+++	57+	60
25			0.5	698	+++	60+	66
26		0.5	645	+++	50	52	

with any one type of treatment used. Where a plus mark (+) follows a numeral in the table, under the heading "General symptoms," it indicates that dyspnea, depression and coma had not appeared at the hour indicated, but death had occurred by the time of the next succeeding observation.

When the intervals elapsing from the time of injection to the time of the appearance of noticeable general symptoms or to the

time of death are studied, it becomes apparent that the injection of filtrates or of suspensions of dead anthrax bacilli probably had no effect on the course of the infection. Moreover, animals injected with 1.0, 2.0, and 5.0 cc of a given filtrate or of the bacterial suspension did not die in an order which would give any suggestion that these materials influenced the progress of the disease.

Guinea pigs injected with filtrates or with dead bacterial suspension alone showed no ill effects whatever, except in the case of guinea pig 4, which was injected with the filtrate of the culture of *B. anthracis* in peptone solution to which fresh tissue had been added. This animal was noticeably ill at the 50th and dead at the 66th hour. On autopsy it presented a markedly enlarged and congested spleen and the blood was but partly coagulated; other abnormal findings were not observed. Cultures were made from heart-blood and spleen; the former yielded a few colonies of a short, plump, Gram-negative, non-chain-forming, non-sporulating bacillus, which belonged to the colon group. The spleen cultures yielded a plentiful growth of the same organism. This organism might be considered as a postmortem invader. (About six hours had elapsed between the death of the animal and time of autopsy.) Heart-blood smears microscopically appeared sterile; spleen smears revealed the colon-like organism. No anthrax bacilli were found.

Since there was some possibility that guinea pig 4 died of the toxic effects of the filtrate which had been injected, two other guinea pigs (27 and 28) were injected intraperitoneally with 5.0 cc each of the same material. These animals were weighed daily and were kept under close observation until the fourth day, when they were killed and autopsied. Neither animal appeared to be ill at any time during the four days after treatment. At autopsy of these animals, especial attention was directed to note the occurrence or absence of abnormal findings which might be suggestive of anthrax. No indication of infection or of toxic effect was observed.

ANIMAL INOCULATIONS. TESTS FOR IMMUNIZING QUALITIES OF CULTURE FILTRATES

A number of rabbits were utilized in attempts to determine whether the culture filtrates or sterile bacterial suspension prepared as above described were capable of inducing some degree of immunity. Injections of these materials were made into the

peritoneal cavities of the animals. Some of the animals received two such treatments with filtrate. To determine whether any increase in resistance to infection by *B. anthracis* had been induced, all treated animals and untreated controls were subsequently inoculated with a suspension of virulent anthrax bacilli and observations were made of the results of the exposure to infection.

TABLE II—*Tests on rabbits for immunizing value of culture filtrates and bacterial suspension*

RABBIT	CULTURE FLUID INJECTED			VIRULENT CULTURE	RESULTS
	KIND	7-1-26 (cc)	7-10-26 (cc)		
1	Filtrate	5.0	5.0	1.0	Died 33 hrs.
2	Bovine	5.0	5.0	1.0	Died 122 hrs.
3	Blood-	5.0	5.0	1.0	Severe reaction, lived
4	Serum	—	5.0	1.0	Died 73 hrs.
5		—	5.0	1.0	No appar. illness, lived
6		—	5.0	1.0	No appar. illness, lived
7	Filtrate	5.0	5.0	1.0	Died 38 hrs.
8	Tissue	5.0	5.0	1.0	Died 58 hrs.
9	in	5.0	5.0	1.0	Died 70 hrs.
10	Peptone	—	5.0	1.0	Died 36 hrs.
11	Solution	—	5.0	1.0	Died 52 hrs.
12		—	5.0	1.0	Died 60 hrs.
13	Filtrate	—	5.0	1.0	Died 28 hrs.
14	Egg	—	5.0	1.0	Died 26 hrs.
15	Solution	—	5.0	1.0	Died 26 hrs.
16	Filtrate	5.0	—	1.0	Died 78 hrs.
17	Milk-	5.0	—	1.0	Died 96 hrs.
18	Serum	5.0	—	1.0	Died 120 hrs.
19				1.0	Died 34 hrs.
20				1.0	Died 78 hrs.
21	Controls			1.0	Died 58 hrs.
22				1.0	Died 46 hrs.
23				1.0	Died 38 hrs.
24				1.0	Died 47 hrs.

Table II presents the data on this experiment in a tabular form and shows the materials and amounts injected; the number of injections each animal received, the interval elapsing before administration of virulent cultures and the results of the inoculation. At death the animals were necropsied, at which time they were examined and cultures and smears were made of the spleen and heart-blood. The virulent cultures used for animal inoculation in this experiment were made in the same manner as that

employed in the previously described tests on guinea pigs, except that for the rabbits reported on in table II, a 72-hour broth culture was prepared.

EQUINE BLOOD-SERUM CULTURE FILTRATES

Based upon the results of this series of tests, the preparation of anthrax culture filtrates in which certain diluted and undiluted quantities of equine serum served as the culture medium were undertaken. The procedure employed in preparing equine-serum culture filtrates is described above. Controlled quantities of these filtrates were introduced into the peritoneal cavities of guinea pigs. At the same time these animals, together with controls, were infected subcutaneously with uniform quantities of a two-weeks-old broth culture of the same strain of *B. anthracis*

TABLE III—*Tests on guinea pigs of the toxic action of equine-serum culture filtrates*

GUINEA PIG	FILTRATE INJECTED		B. ANTHRACIS CULTURE INJECTED (cc)	SURVIVED (DAYS)
	I ¹ (cc)	II ² (cc)		
27	5.0	—	0.5	5
28	5.0	—	0.5	Lived
29	2.0	—	0.5	Lived
30	—	5.0	0.5	4
31	—	5.0	0.5	Lived
32	—	2.0	0.5	5
33	—	—	0.5	4
34	—	—	0.5	7

¹Filtrate I represents the combined cultures of *B. anthracis* in 10% and 25% equine serum previously described.

²Filtrate II represents the combined 50% and undiluted serum cultures.

which had been employed in the foregoing experiments. Observations were made regarding the relative length of survival of the test animals, to determine whether the injection of filtrates would lead to an earlier death and thus give evidence of the presence of a toxic or other disease-promoting factor. Table III presents the data with regard to this test.

Those animals that died during the course of this test were necropsied and a positive diagnosis of anthrax was established in each case. The guinea pigs which survived the test showed the usual edematous areas at the point of inoculation with the culture of *B. anthracis* but no other disturbances were noted.

The equine-serum culture filtrates also were utilized on rabbits in tests so designed as to determine whether the filtrates possessed

any immunizing qualities. The rabbits were treated intraperitoneally with controlled quantities of filtrate and fourteen days later were exposed to infection by the subcutaneous injection of 1.0 cc of a broth culture of *B. anthracis* into each individual. It may be noted that in the tests reported in table III a rather low grade of virulence was exhibited by the strain of *B. anthracis* employed. On this account a reisolation of *B. anthracis* from guinea pig 30 (table III) was subcultured into broth and one cubic centimeter of this transplant at 24 hours was used to infect a rabbit subcutaneously. The rabbit died of anthrax in 56

TABLE IV—*Tests on rabbits for immunizing action of equine blood-serum filtrate*

RABBIT	FILTRATE INJECTED		VIRULENT CULTURE INJECTED SUBCUTANEOUSLY (cc)		SURVIVED (DAYS) ^a
	I ^b (cc)	II ^c (cc)	5-24-27	5-31-27	
25	10.0	—	1.0	0.5	Lived
26	10.0	—	1.0	0.5	Lived
27	5.0	—	1.0	0.5	Lived
28	5.0	—	1.0	0.5	Lived
29	2.0	—	1.0	Dead	4
31	2.0	—	1.0	0.5	Lived
32	—	10.0	1.0	0.5	Lived
33	—	10.0	1.0	Dead	5
34	—	5.0	1.0	0.5	Lived
35	—	5.0	1.0	0.5	Lived
36	—	2.0	1.0	0.5	10
37	—	2.0	1.0	Dead	7
38			1.0	0.5	8
39			1.0	0.5	8
40	Controls		1.0	Dead	4
41			1.0	Dead	5

^aFiltrate I represents the mixture of 10% and 25% equine-serum culture filtrates.

^bFiltrate II represents the mixture of 50% and undiluted equine-serum culture filtrates.

^cSurvival in days after the initial injection of virulent culture.

hours; *B. anthracis* was again reisolated from the heart-blood. The culture from the rabbit in which a higher degree of virulence was expected was then promptly used in preparing the broth cultures with which the rabbits treated with equine-serum culture filtrates were exposed to infection.

The virulence of the strain of organisms still was found to be low, requiring during the course of the test two injections of the same. The measure of resistance to infection employed then was comparable to that which would be encountered during rapid hyperimmunization.

Table IV presents the data on the manner in which this test was conducted and on the results.

Necropsies and cultural examinations confirmed death to be from anthrax in all animals dying during the conduct of this test. The animals surviving the test at no time appeared to be ill, edematous swellings appeared to be negligible in extent, which latter, however, also was true in all but two of those which succumbed.

DISCUSSION

In considering the data which have been presented, tables I and III, which contain records of the tests for toxic or infection-promoting substances in the various filtrates and in the bacterin, may be examined in conjunction with each other. Evidence does not appear that any of the materials under investigation which were used in treating the test animals modified the length of period by which the guinea pigs survived the administration of virulent cultures. Toxin production by *B. anthracis* has heretofore not been demonstrated, and in this study evidence of elaboration of toxins or of aggressins by that organism failed to appear.

Inquiry is then directed toward the question whether evidence of an immunizing action appeared to follow the treatment of rabbits with the various anthrax culture filtrates. That portion of the work reported in table II should next be considered. In interpreting the results of this experiment note should be taken of the group of controls. One of these (rabbit 19) died by the 34th and another (rabbit 20) by the 78th hour after infection. The four other controls died at intermediate periods. Since a fairly uniform amount of virulent culture was administered to them, a considerable variation in natural resistance probably was the chief factor in causing the difference in the period of survival. This factor must be kept in consideration in weighing the results secured on the treated animals.

If it is granted that the two control rabbits (19 and 20) which died earliest and latest, respectively, presented also approximately the minimum and maximum degrees of natural resistance to anthrax infection which was encountered in the entire group of test animals, some inferences may be drawn but should not be accepted without qualification. It is evident that probably no high degree of resistance to infection with *B. anthracis* was induced by the injection of any of the filtrates used, since there were losses from anthrax in each group of similarly treated

animals. To determine whether the injection of filtrates had any effect upon the resistance presented by the various animals used, further analysis is necessary.

The results observed on rabbit 1, treated with the blood-serum culture filtrate, indicate that this animal may have been in a sensitized state at the time of inoculation with *B. anthracis*, since it died earlier than any of the controls and far earlier than any others treated with the same material. Support is lent to this view by the fact that rabbits 3, 5 and 6, treated with blood-serum culture filtrate, survived the test inoculation; rabbit 2 lived 44 hours longer than the most resistant control (rabbit 20). Further indications of sensitization are yielded by the results on rabbits 16, 17 and 18, treated with egg-culture filtrate, which died at the 26th and 28th hours after infection and considerably earlier than the least resistant control. Bail¹⁰ noted a similar effect when injections into test animals of edematous fluid from cases of anthrax were followed by an injection of virulent cultures after an insufficient time interval or when excessive quantities of such fluid were injected. Under such circumstances the animals appeared to be less resistant to infection than untreated controls. That guinea pigs (see table I) injected with the blood-serum or egg extract gave no evidence of a more severe or rapid infection, as compared with controls, is referable to the fact that a period of time must always elapse after the introduction of a sensitizing agent before the sensitized state is developed.

Turning to the consideration of evidences of increased resistance to infection with *B. anthracis*, we find this most clearly suggested by the results on those rabbits which had been treated with blood-serum culture filtrate. Rabbit 3 was markedly depressed the third and fourth days after administration of the virulent bacilli, but it recovered, and rabbits 5 and 6 survived the test inoculation without giving any evidence of severe illness. Moreover, rabbit 2 of the same group lived 44 hours longer than did the most resistant control animal. The difference in the resistance of this group of animals as compared with the controls is most suggestive of some degree of fortification against infection by *B. anthracis*.

This also is true, though in a lesser degree, of the group of rabbits treated with milk-serum culture filtrate. The earliest member of this group to die (16) lived as long as the most resistant control (20). The other two treated animals (17 and 18) lived 18 to 42 hours longer, respectively, than rabbit 20. The

difference in behavior, however, of this group, as compared with the controls, while suggesting the presence of some antigenic value in the milk-serum culture filtrate, does not give conclusive evidence regarding the point in question.

No evidence appears in the results obtained on animals treated with the filtrate of the culture of *B. anthracis* in peptone broth containing fresh tissue to indicate that this material had antigenic value. The treated animals died within the time limits demarcated by the death of the most and least resistant controls.

The studies on the immunizing action of filtrates of diluted and of whole equine blood-serum cultures of *B. anthracis* are summarized in table IV. These are now to be dealt with. It has been previously noted that capsules were observed to be formed (though apparently with less regularity) by *B. anthracis* growing in a medium composed of only 10 per cent equine blood-serum, and that capsule formation was observed in all cultures. This is of importance, since the capsulated bacillus is the type which is characteristically predominant in cases of infection and apparently is the type which carries the significant antigenic load.¹⁵ Thus both filtrates I and II of equine blood-serum cultures may be considered to have been quite similar in type if not in quantity of antigenic content. It has been noted above, however, that multiplication of *B. anthracis* was more rapid in the lower concentrations of equine serum; the total amount of growth present at the end of the incubation period of seven days appeared to be greatest in the more dilute serum cultures, as judged by final turbidities and by stained preparations from the various separate quantities. *A priori*, then, we might expect the more active immunizing action from filtrate I and experimental results support the conclusion.

In conducting this test a period of fourteen days elapsed between the administration of filtrates and the injection of virulent cultures. Evidences of sensitization did not become apparent as in the earlier test (table II), where only nine days intervened. Eight out of twelve treated rabbits survived (see table IV) the test inoculations, while all (4) of the controls died. The apparent ratio of protection may then be expressed as 66 per cent.

When filtrates I and II are compared it appears that the former may have had superior antigenic value. Only one of the animals treated with filtrate I died; this indicates 83 per cent protection, though the small number of animals used does not

justify this numerical expression of protective efficacy to be given great significance. No observation was made which would account for a greater antigenic potency on the part of filtrate I than that multiplication of *B. anthracis* in the cultures carrying the lower concentrations of equine serum was more rapid and resulted in the production of a greater mass of organisms by the end of the incubation period.

The antigenic substance contained in the blood-serum culture filtrate differs from materials contained in subcutaneous exudates in cases of anthrax, which Bail named "aggressins," since it possesses no infection-promoting quality. It apparently, however, has this in common with the "aggressin," that it may induce sensitization in the treated animal, which state is followed by increased resistance.

Intense interest may be attached to further work in this direction. To obtain more uniform results in securing protection the following points may be of value:

1. Allowing an adequate interval of time between the administration of the antigenic material and the introduction of infection.
2. Removing the anthrax bacilli from the cultures by some other means than filtration, the use of which method may also result in the loss of part of the antigen.
3. The purification or concentration of the antigen by fractionating the culture materials prior to their use.

Work of this character is being projected and will be conducted as rapidly as circumstances permit.

SUMMARY AND CONCLUSIONS

B. anthracis was cultivated in (a) filtered bovine blood-serum, (b) egg solution in physiological salt solution, (c) milk-serum and (d) in peptone broth to which was added fresh liver and spleen. After incubation for 48 hours at 37° C., the culture media were again filtered and this material was used (1) in testing their toxic or infection-promoting qualities on guinea pigs and (2) in testing their antigenic qualities on rabbits.

B. anthracis was also cultivated in filtered equine blood-serum, the whole serum and certain dilutions of serum in standard broth being used. These cultures were incubated 14 days at 37° C., when they were again filtered and used in tests as before.

Cultures of young anthrax bacilli in Dunham's peptone solution also were prepared and the bacilli killed by adding 1 per

cent phenol and heating to 56° C. for one hour on each of two consecutive days. This suspension of bacilli was tested on guinea pigs to determine whether it had any toxic or infection-promoting qualities.

Under the conditions of the experiment, no toxic effects or infection-promoting qualities (*i. e.*, aggressive action) were demonstrated in any of the materials used.

A mixture of anthrax culture filtrates, where 10 and 25 per cent equine blood-serum in standard broth served as the culture medium, gave evidence of having considerable immunizing value. Only one animal out of six treated with this material died, while all of the four untreated controls died following the inoculation with virulent cultures. Whole equine blood-serum and 50 per cent of the same in standard broth yielded, on inoculation with *B. anthracis* and subsequent filtration, a somewhat less potent immunizing antigen.

Whole bovine blood-serum culture filtrate also gave some evidence of antigenic quality. This was again true, but to a lesser extent, of the milk-serum culture filtrate.

A filtrate of *B. anthracis* grown in peptone broth to which was added fresh tissue gave no evidence of antigenic value.

Egg culture filtrate appeared to have induced a sensitization; this is also true in one instance where blood-serum culture filtrate was used, and there are reasons for assuming that the sensitized state observed was the forerunner of a state of fortified resistance, since it is probable that more favorable results would have followed attempts to immunize the test animals in these instances if a longer period had been permitted to elapse between treatment with filtrate and inoculation with virulent organisms.

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"How did you hurt your hand, Smitty?"

"Nailing up a horseshoe for luck."—Oregon Orange Owl.

A REPORT ON LAMB DISEASES

By ERWIN JUNGHERR and HOWARD WELCH

Department of Veterinary Science, Montana Experiment Station

Bozeman, Montana

We recognize two distinct types of sheep management in Montana: farm flocks, of 50 to 500 ewes; and range sheep, run in units of approximately 1500 to the band.

The farm flocks are kept in fenced pastures during the summer, are housed and fed hay during the winter and are usually lambed in March. The range sheep are taken to summer range, which may be either mountains or plains, for summer feed, and are ranged out as long as possible during the fall and winter. Some are lambed in sheds in April, others on the range in May. Although there are losses, especially among the lambs, under either type of management, the diseases producing these losses are quite different. The management, feed, care, housing, exercise, and other things that might serve as predisposing factors are materially different in range sheep as compared to farm flocks. One factor is common—the weather. The loss in the young lambs, up to three or four weeks of age, will vary a great deal from year to year, depending on the weather during lambing. Protracted wet snow storms and cold winds, even though the sheep are adequately protected by sheds, will in time depress the vitality of the lambs, and constitute the direct cause of death of many sickly lambs that might have survived under more favorable circumstances.

In studying these diseases of lambs, the material most available was from the sheep on the small irrigated farms near the Station, and consequently most of the discussion that follows has to do with farm sheep.

Most sick lambs, if they move about at all, move with a stiff, awkward, stilted gait. Thus there has been a tendency among sheepmen to classify most of these sick lambs as "stiff lambs" and they refer to this as a specific disease. It is our belief, after considerable observation of conditions at lambing time, that there are about three definite diseases that have been classified under the heading of "stiff lambs." Symptoms, as observed in the field, or as related by the owner, are not very definite, cer-

tainly not diagnostic. From the pathological and bacteriological findings that we have encountered in studying these lamb diseases, we have made the following classification:

1. Umbilical infection
2. Coccidiosis (white muscle lesions)
3. *Vibron septique* infection

UMBILICAL INFECTION

Umbilical infection in lambs, with or without its subsequent polyarthritis, is a well-established fact. Umbilical infection is about the only well-defined disease in the group summarized as "stiff lambs." According to our observations, it is a disease of sheep run on small pastures, and not a disease of range sheep. Moreover, we believe that the use of cattle and horse barns as lambing-sheds, and corrals and pens that are in use by live stock daily the year around, tends to provide the maximum opportunity for the invasion of the navel cord by infection. Range sheep are in their sheds but once a year, usually during April. The remainder of the time the sheds and pens are empty, dry, and quite thoroughly sterilized by sunlight. Though no doubt umbilical infection does occur in range lambs, the typical stiff lamb is seldom seen at a big lambing-shed.

Some of the infections that gain entrance may produce the typical swellings of arthritis, some may produce only local inflammations, but either tends to make the movement of the lamb slow and painful. Some of the affected lambs recover—possibly 10 per cent—but most of them die in a few days, from starvation, exhaustion and infection.

In the spring of 1917, rather extensive losses of this type caused us to advise the thorough disinfection of the navel immediately after birth, and the practice brought extremely favorable results. Observations on many ranches for the next two years showed that the more carefully this detail was attended to, the less loss occurred. The whole matter of navel infection has been intensively investigated, especially in connection with horse-raising and the similar disease in foals. The bacteriology of umbilical infection in lambs was studied by N. Johansen.^{1,2} In his conclusions, Johansen states that paralysis in lambs is caused in the greater number of cases by navel infection. In foals, however, not all cases of joint-ill can be explained on the basis of a simple umbilical infection at birth. In some instances the most conscientious disinfection of the navel is of no avail and the possi-

bility of an intra-uterine¹ or intestinal² infection remains open. Furthermore, recent researches of Beller⁴ show that bacteria occur under normal conditions in the fetal membranes, fluids and placental vessels, a point that might throw some light on the occasional failure of umbilical disinfection. Ordinarily, the navel cord of the lamb has dried and withered up in four to six hours after birth, and any infection must have taken place before that time. The first symptoms do not appear for a period ranging from a week to four weeks later. Postmortem examination shows no striking changes. The umbilical vein may contain some blood toward its distal end, but this is not a constant feature. When *B. necrophorus* has gained an entry, then there are the specific lesions in the liver,^{5,6} otherwise the lesions are non-specific, ranging from the abscesses of arthritis to invisible lesions. Much more work will have to be done in order to make possible a definite diagnosis of umbilical infection, however definitely it may be recognized in the field by those familiar with this disease.

Coccidiosis

The occurrence of coccidia in lambs has been reported by many observers, but it is our belief that it has been mostly older lambs, feeder lambs, etc., in which coccidia have been thought to be the causative factor of a definite disease. Lerche^{7,8} studied the coccidia of sheep, finding them similar to *Eimeria arlongi* of the goat. Spiegel⁹ found a new coccidium in the sheep, *Eimeria intricata*; L. Sheather¹⁰ described a new species of an intestinal coccidiosis of sheep. Martin, of the Nebraska Experiment Station, described coccidiosis in lambs, with emphasis upon white foci in the small intestines as typical lesions. Newsom¹¹ assigns to *Eimeria faurei* the role of a causative factor in the coccidiosis of feeder lambs and differentiates between a chronic and an acute coccidiosis.

In this laboratory we have carried out a large number of fecal examinations of sheep during the past few years, having in mind a possible correlation between the number of nematode eggs present, and the number of parasites actually infesting the sheep.

We found that coccidia were present in approximately 80 per cent of the preparations, and in every case the host animal was in apparently normal condition. The sheep examined included all ages, from three-months lambs to six-year-old ewes, and several hundred were thus examined. With this in mind, and with our failure to find typical white lesions on the intestinal

wall, we had concluded that coccidia played no part in the so-called "stiff lamb" disease, but our interest in this organism as a possible cause was revived when the owner of a flock of Hampshire sheep reported "stiff lamb" losses. We were convinced that the precautions taken on this ranch had eliminated the possibility of umbilical infection, and careful search was made for other causes of trouble. Smears from the intestinal mucosa, and fecal examination from dead and live affected lambs showed coccidia in tremendous numbers. These lamb losses occurred after a protracted wet and snowy period in the spring, which is known to be a predisposing factor in a similar coccidiosis in feeder cattle. The symptoms in the early stage of the disease consist of a peculiar stiff and awkward gait, later becoming an incoordination. The lambs are easily knocked down by their comrades and, once off their feet, lie helplessly struggling on their side. Once raised to their feet again, they seem as strong as before. Some sheep-owners had apparent success with an ounce of castor oil and a soap enema, many lambs recovering entirely with this treatment.

Fecal examination of such lambs was carried out in accordance with a method devised by Sheather,¹² Vajda¹³ and Benbrook.¹⁴ We secure a fecal sample by introducing the index finger into the rectal ampule, and macerate approximately one gram in 2 to 4 cc of water, according to the consistency of the manure. Hard fecal pellets require more water. The fecal suspension is thoroughly mixed with 10 cc of concentrated sugar solution, strained through tea-strainers of 18 and 30 apertures to the inch, and then centrifuged for two minutes at 1800 r.p.m. A large drop of the top layer in the tube is then examined.

Hutyra and Marek¹⁵ state that coccidia can not be found in the intestinal discharge and that the fecal discharge does not become hemorrhagic. In about 90 per cent of our cases we were able to demonstrate the oöcysts of coccidia on fecal examination, and in many of the lambs a blood-tinged diarrhea was evident. However, unless a concentration method is used, coccidia are not easily demonstrated. According to the same authors, *Eimeria faurei* seems to be the most prevalent coccidium, which we also found to be the case (fig. 1), but we also were able to find a much larger coccidium, about 42 by 45 μ . This large coccidium, however, has a smooth coat and must be different from the coccidium described by Sheather.¹⁰ These coccidia, cultivated in 2-5 per cent potassium bichromate solution, according to W. I. Johnson,¹⁶ sporulated within 4 to 7 days. Lesions, on post-

mortem examination, were very seldom localized. In one case we found the cecum of a lamb in a thickened, grayish, diphtheritic condition resembling a subacute typhlitis. In most cases the lesions consist of varying degrees of reddening of the mucosa of the small intestine; exceptionally diffuse hemorrhagic inflammations are present. On examination of deep scrapings, and of sections of these areas, large clusters of coccidia in various stages of development could be found. There seems to be a certain parallelism between coccidiosis in lambs and the similar disease

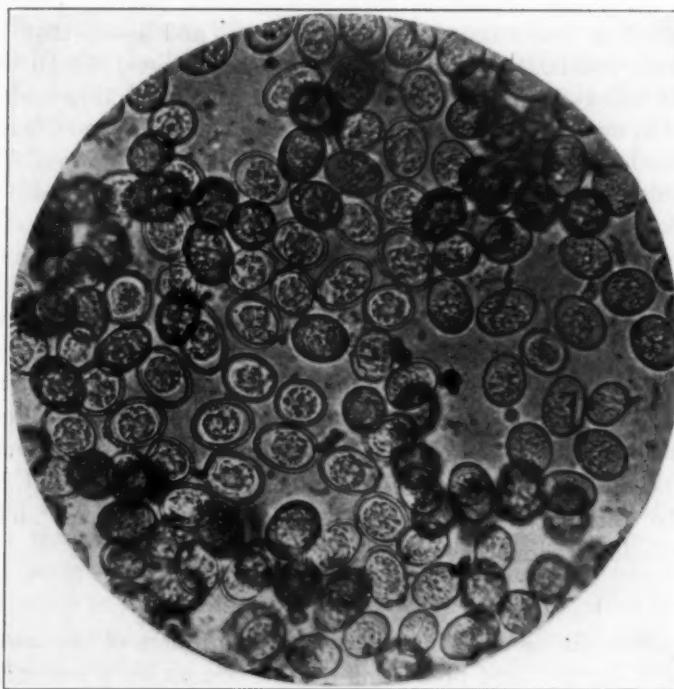


FIG. 1 Coccidia from lamb manure. $\times 336$

in chickens. Coccidia are frequently found in the feces of healthy chickens; until not long ago coccidiosis of chickens was thought to be a disease of the ceca, but now a diffuse form of chicken coccidiosis is recognized, characterized by a hemorrhagic inflammation of the duodenum.¹⁷ The necessary experiments of transferring cultured coccidia to healthy lambs could not be carried out this year, but will be a part of our work next year.

The identification of coccidia as the causative agent of this phase of the "stiff lamb" disease has two complicating factors:

the frequent presence of a Gram-positive diplococcus in the heart-blood, and the occasional presence of white, degenerative changes in the skeletal muscles. The diplococcus, sometimes occurring as short chains, is a facultative aerobe, grows well in Hall's brain medium,¹⁸ on serum-agar slants, etc., but grows poorly or not at all on simple media. The organism is not pathogenic for guinea pigs, and is still under investigation as a possible etiological factor.

The other condition—the white areas in muscles—has been observed by others; Hobmaier¹⁹ reports a *myodegeneratio hyalinosa calcifrons* in lambs, and Metzger and Hagan²⁰ recently described in detail these muscular changes and assert that the cause of "stiff lambs" is to be found in these changes, though they do not believe it to be an infectious disease. Our findings correspond in every detail to those reported by Metzger and Hagan, and we have no doubt that we have seen identical lesions. The muscular changes are whitish in color, occurring either as slender streaks or as whitish areas, quite sharply defined, and of peculiar, dry appearance. Sometimes a few fibers only, sometimes more than half of a muscle, and again a whole muscle, will show this degeneration. In a large number of "stiff lamb" cases we were able to find these muscular changes in only a few instances. In all but one case these changes occurred in lambs showing pronounced coccidiosis. We are by no means prepared to construct a relationship between coccidiosis and the white-muscle lesions. On the other hand, in a large number of lambs examined, the number that showed these white lesions was so small that we did not consider them to be of primary importance.

BRADSOT-LIKE DISEASE

Another disease showing the general symptoms of the disease of "stiff lambs," and presenting definite lesions on postmortem, is a bradsot-like disease. During the protracted cold and stormy lambing season of 1927, several sheepmen reported stiff and sick lambs with considerable loss. Postmortem examination of fresh cases showed the abomasum to be affected principally. The mucosa was petechiated, separated in many places from the underlying serosa to form gas-filled bubbles, often thickened, and in many places necrotic. In one instance we found this condition in the duodenum and not in the abomasum. Smears made directly from within these gas bubbles showed large, slender, Gram-positive rods, sometimes in chains; a few subter-

minal spores were seen. Sections of these emphysematous lesions showed organisms of a similar morphology.

The original cultures from stomach lesions, spleen, heart-blood and liver were made in freshly boiled Hall's brain-medium tubes¹⁸ and on liver-agar slants. The aerobic cultures usually remained sterile; the brain-medium tubes regularly showed abundant growth, with gas-formation within eighteen hours. In smears a motile, Gram-positive rod was found, and few central or subterminal spores. The culture, although seemingly pure, was put through a rigorous process of purification by repeated seeding of dilutions into 2 per cent liver-agar and upon serum-agar slants, the latter incubated according to Wright's method. The colonies in deep agar shakes were round, dense in the center, and with a halo of fluffy filaments on the circumference. Surface colonies were opaque and somewhat flattened. Brain was not blackened by the organism, not even after the addition of an iron nail; milk was coagulated after incubation for four days; Hall's gelatin was liquefied. The organism grew readily in 2 per cent dextrose-meat infusion agar. The organism fermented glucose, lactose and salicin, and did not ferment saccharose and inulin, the tests being prepared in a 1 per cent carbohydrate sugar-free, meat-infusion broth in Hall's constricted fermentation tubes. The organism was pathogenic for guinea pigs in doses of 0.5 cc, the lesions in guinea pigs corresponding to the picture and description given in Report 39²⁶ for the action of *Vibron septique*.* Liver impression smears from guinea pigs, 3-4 hours after death, showed long threads of organisms and many orgonts. The organism was compared with *Vibron septique* (strain 12)²¹ which we happened to have in our collection through the courtesy of Dr. I. C. Hall and was found to correspond in all cultural characteristics, so leaving no doubt for the final identification as *Vibron septique*. *Vibron septique* was isolated from the stomach lesions liver and heart-blood of the affected lambs. The stomach lesions contained the organism, regularly in pure culture; the heart-blood sometimes contained also the Gram-positive diplococcus, mentioned before; in one case the spleen contained *B. welchii*, type 2.

Except for the fact that the losses in these outbreaks were comparatively small and that the lambs were only four to five

*Working with other animal-pathogenic anaerobes at the same time, we noticed a distinct shading in guinea pig lesions; *B. chauvoei* produced the darkest lesions, *V. septique* followed, then *B. welchii*, and finally *B. novyi*.

weeks old, we should be justified in identifying this disease as bradsot or braxy.

To incriminate *V. septique* as the cause of a specific disease in sheep and lambs is by no means a novum. Heller²⁷ studied *V. septique* strains from sheep sources; Beach²⁸ reported a fatal disease of feeder lambs due to *V. septique*; Gaiger²⁹ recognized *V. septique* as the true cause of braxy, the organism being found identical with Jansen's bradsot bacillus; Miessner³⁰ identified his Magenrauschbrand bacillus as true *V. septique*, and many others reported similar findings. On the other hand, there are investigators who found that *V. septique* occurs in the intestinal tract of normal animals³¹ and that the pathogenic role of this organism is not entirely cleared,^{32,33} but all these reports tend only to show that *V. septique* is of very wide distribution and has the ability of becoming pathogenic if conditions are favorable.

DYSENTERY

This is a disease of young lambs, one to five days old, that is not directly associated with the three conditions mentioned above, but deserves mention on account of the tremendous losses that it occasioned this year. We do not find that it has been reported in this country, nor do the older sheepmen of Montana recall any such condition in previous years. In England, Gaiger and Dalling³⁴ and Dalling^{35,36,37} observed extensive losses from lamb dysentery at the age of from one to fourteen days, attributed the disease to *B. coli* and *B. welchii* infection, reproduced the disease by feeding intestinal contents of infected lambs and by cultural inoculations, and carried out successful active and passive immunization experiments with specific anti-sera and vaccines.

In early 1927, several range sheepmen reported severe losses at lambing time from a diarrhea. These reports were investigated, and a dysentery of young lambs was found at eight lambing-camps, with losses up to 30 per cent. The lambs were apparently normal at birth, but at about twelve hours of age developed a yellowish pasty fecal discharge, with considerable weakness and lack of appetite ensuing. After 24 to 48 hours, the lambs became comatose and died, probably 10 per cent recovering. Either the milk of the ewe or contamination of her udder seemed responsible, for in hundreds of instances, when a lamb died, the owner would give the ewe one of a healthy pair of twins to adopt. In almost every case the adopted lamb would also develop dysentery and die, while the other of the pair of twins would remain

healthy. One sheepman reported very favorable results from thoroughly cleansing and disinfecting the udder of such a ewe, and then giving her a lamb to adopt. The weather conditions during this time were very unfavorable, but no other predisposing conditions were found constant. Postmortem examination revealed the presence of an acute hemorrhagic enteritis, and a liver in a heavily congested, tumefied state.

From the few cases that came to the laboratory in a fresh condition, we were able to isolate *B. coli* and *B. welchii* as the principal organisms. Bacteriological examination of ewe's milk yielded the same organisms in abundance, a fact already suspected from field observations. It is remarkable that our findings corresponded so closely with those of Gaiger and Dalling, the only point of difference being that our cases seemed somewhat more virulent, very few lambs living more than 48 hours after the beginning of the diarrhea.

As far as we could learn, no case of this dysentery occurred in pasture flocks, but only at the lambing-camps of the range outfits. These outbreaks were widely separated and, except for three cases on one stream of water, there was no apparent connection between them. One outbreak was situated 200 miles from any other.

DISCUSSION

Of the lamb diseases brought to our attention this last spring, the most important by far was the lamb dysentery characterized by its virulence and high mortality. The other three diseases, umbilical infection, coccidiosis, and the bradsot-like disease, had in previous years been vaguely classified as "stiff lambs," on account of the prevailing symptom of stiffness. In former years, from the fact that heavy losses, due to umbilical infection, had been easily controlled by rigorous disinfection of the navel, we had not recognized the presence of other factors.

Coccidiosis in lambs showed some similarity to coccidiosis in cattle, in that its onset followed closely a cold, wet spell. The finding of numerous oocysts in manure samples, the presence of all stages of coccidial development in smears from the more or less hemorrhagic lesions of the intestines, the field observation that a thorough intestinal lavage during the early stages is of certain value, indicated that coccidia must be regarded as possibly pathogenic factors in "stiff lambs."

White muscle lesions of a degenerative nature, similar to those described by Metzger and Hagan, were found in many

cases, but their relatively infrequent occurrence and the presence of coccidiosis suggests that they are probably secondary in nature.

A bradsot-like disease was observed in lambs, the diagnosis being based upon hemorrhagic, emphysematous stomach or intestinal lesions and the presence of a virulent sporulating anaerobe in stomach lesions and heart-blood, the identity of the anaerobe being definitely established as *Vibrio septique*.

Our rather brief investigation indicates that the subject of "stiff lambs" is somewhat complex and that more work must be done. This is in the nature of a preliminary report, the study of these diseases to be continued during the next lambing season.

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THERE AND BACK

A worthy missionary in India had the hymn "Rock of Ages" translated into Hindustani. On retranslation into English by a student, the first two lines bore this inspiring and illuminating aspect:

"Very old stone, split for my benefit,
Let me absent myself under your fragments."

—Country Gentleman.

A PRELIMINARY REPORT REGARDING EPIDURAL ANESTHESIA IN EQUINES AND BOVINES*

By W. M. MCLEOD and E. R. FRANK

*Department of Surgery and Medicine, Division of Veterinary Medicine, Kansas State Agricultural College
Manhattan, Kansas*

At the 1926 meeting of the American Veterinary Medical Association, Professor Benesch, of Vienna, demonstrated a form of regional anesthesia on the cow which is rapidly gaining favor among American veterinarians. Since that time we have made an effort to extend the field and usefulness of this justly popular form of anesthesia.

A satisfactory name for the method has not appeared. The use of Professor Benesch's name, while laudable, does not convey any impression of the field involved. The terms intracaudal and intraspinal anesthesia are also used. Labet, in his book, *Regional Anesthesia*, described a method, for the human, which he terms "caudal block," also known as "epidural or extradural block," wherein the anesthetic solution is deposited in the epidural space, as it is in the method we are using. In true spinal anesthesia the anesthetic is injected into the subarachnoid space, a procedure that occasionally leaves the subject with a permanent nervous disturbance. The use of the epidural space as a receptacle for anesthetic solutions is not followed by unfavorable sequelae. Inasmuch as the solution, in the method under discussion, is placed outside the dura mater, we feel that the term epidural anesthesia is proper terminology.

The case reports and descriptions of the Benesch method have, so far, been silent on the subject of anatomy. We find an intimate knowledge of this subject essential and, therefore, wish to mention a few of the important anatomical features of the region involved.

The equine sacrum consists of five fused segments. The spines are directed backward and rapidly decrease in length posteriorly. The contour of the croup, then, is no criterion as to the direction of the sacral canal. The summits of the spines, except that of the first, are often bifid and not very distinct on palpation; the lack of distinctness being due, for the most part, to the extensive attachment of the dorsal sacro-iliac ligament. The space be-

*Presented at the thirty-fourth annual meeting of the Missouri Valley Veterinary Association, Omaha, Nebraska, July 11-12-13, 1927.

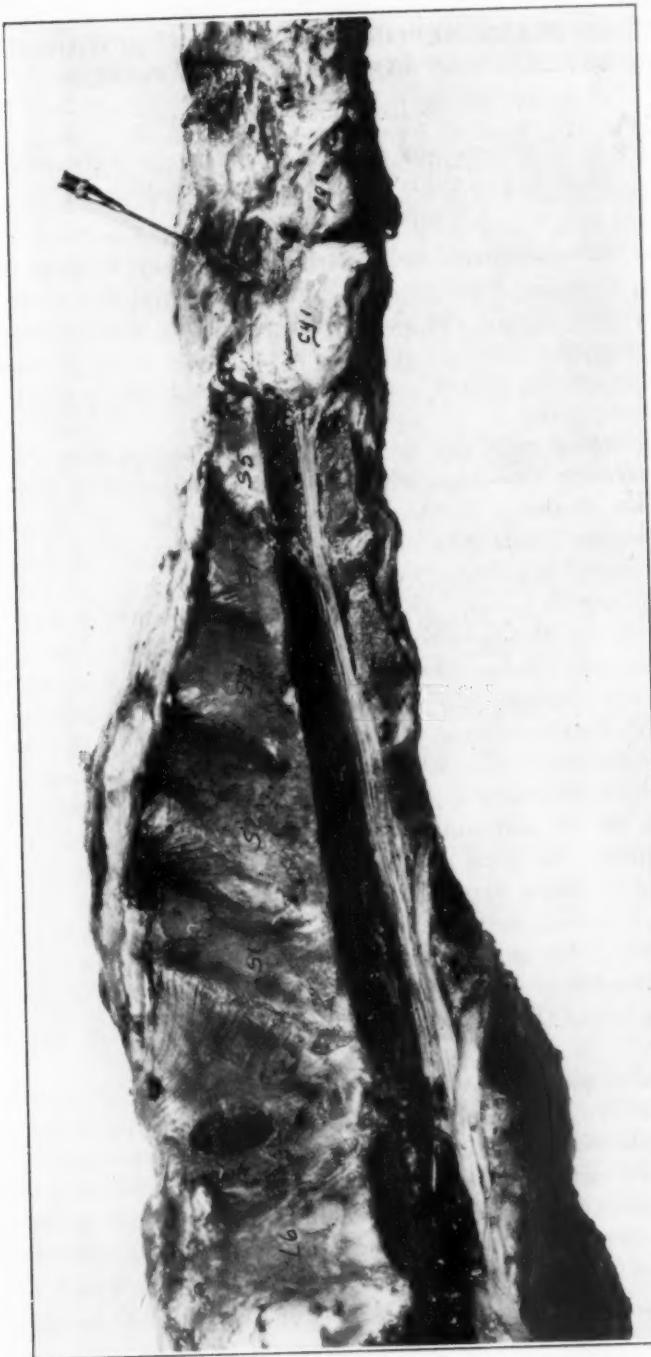


FIG. 1. Lateral view of a portion of the vertebral column with the canal opened. The black material below L6 is colored agar, which was injected into the canal to show the distribution of the anaesthetic solution. The needle is inserted in the first intercoccygeal space. L6, sixth lumbar vertebra; S1, S2, S3, S4, S5, the sacral vertebrae; Cy1, Cy2, first and second coccygeal vertebrae.

tween spines is small and occasionally completely closed by osseous tissue.

The first coccygeal vertebra is always closely and firmly attached and is sometimes ankylosed to the apex of the sacrum. The second coccygeal vertebra is much smaller than the first and the spines of the two are separated by a considerable interval. This, the first intercoccygeal space, is the first place back of the lumbo-sacral junction where a needle may readily be inserted into the vertebral canal.

The sacral canal rapidly diminishes in size from before backward. At the lumbo-sacral junction a noticeable enlargement of the canal exists. This accommodates the lumbar enlargement of the cord, allows for some movement without endangering nerve structures, and provides a rather large epidural space.

The bovine sacrum is longer and narrower than that of the horse. The spines are more nearly of equal length, decreasing a little toward the posterior part of the structure, and are fused to form a continuous ridge, the summit of which is of unequal width. The lateral border of the sacrum is, for the most part, easily palpated and frequently presents a distinct enlargement at the postero-lateral angle. From this angle the posterior border of the sacro-sciatic ligament forms the basis for a prominent line to the tuber ischium.

The bovine coccygeal vertebrae are much better developed than those of the horse. The prominent spines and transverse processes of these vertebrae, the lack of large caudal muscles, and the free movement make the location of the first intercoccygeal space fairly easy.

The terminal part of the spinal cord (*conis medullaris*) ends at the anterior part of the sacrum. In the embryo the arbitrary divisions of the cord (cervical, thoracic, lumbar and sacral) correspond to similar regions of the vertebral column. Through unequal growth this correspondence becomes unequal in the anterior regions and is lost in the lumbar and sacral regions. The fifth and sixth lumbar spinal nerves run backwards, the sixth the length of the last lumbar vertebra, to reach their intervertebral foramina. The sacral and coccygeal nerves traverse the sacral canal. Except at the lumbo-sacral junction and again in the anterior coccygeal region the nerve trunks, surrounded by fat, fill this part of the vertebral canal.

The spinal nerves, from the third lumbar posteriorly, supply all the structures back of a transverse plane touching the lower



Fig. 2. Lateral view of a portion of the vertebral column showing the terminal part of the dura mater and cauda equina. L5, L6, the last two lumbar vertebrae; S1, S2, S3, the first three sacral spines; F, the cauda equina; C, the first three ventral sacral foramina.

part of the last rib. The pelvic viscera and genitalia, other than those reached by branches of the spinal nerves, are dependent upon the sympathetic system. The latter is connected to each spinal nerve by the ramus communicans. If we can block the spinal nerves as they emerge from the dura mater we can produce anesthesia in the region supplied by these nerves.

In order to learn just where the anesthetic went when injected into the vertebral canal at the first intercoccygeal space, we injected a specimen with a warm, colored, agar solution. The specimen was kept in as nearly the natural position as possible during the injection and while the agar hardened. The canal was opened and the agar found in the coccygeal part of the canal and in the epidural space from the first sacral to the third lumbar vertebrae, practically the entire amount being in the latter location. It appears, then, that a small quantity of anesthetic will anesthetize the tail and that a larger amount will "block" the nerves at their emergence from the dura mater. In our experimental injections we were able to anesthetize the tail with as little as ten cubic centimeters of solution while larger quantities (40 cc) blocked the nerves as far forward as the fourth lumbar.

Procaine and duleene are the preparations we have used. They appear to be equally satisfactory. The strength of the solution seems to have an important relation to the degree of anesthesia. In our first successful attempt we used 60 cc of a 2 per cent dulcene solution. The anesthesia developed rapidly and was complete for the region involved. The mare's hind quarters were so completely anesthetized that she was unable to get up for three hours. Since, we have used one per cent solutions, which, so far, have produced the desired loss of sensation and motor incoordination that renders the hind quarters wobbly but allows the animal to stand. Dosages used are 10 to 15 cc to anesthetize the tail and from 30 to 40 cc for the pelvic viscera and genitalia.

The anesthesia develops rapidly. In five minutes the base of the tail has lost its power of movement. The lower part of the tail is moved from side to side; the upper part is stationary. A noticeable kink, which moves toward the end of the tail, indicates the progressive loss of motility. In ten to fifteen minutes, the gait becomes unsteady, the tail stationary and the external genitalia relaxed and insensible. In twenty minutes anesthesia is complete. The duration of anesthesia is from one to two

hours. When solutions stronger than one per cent are used, sensation and motor reflex are slower in returning.

A 16-gauge needle, two inches long, is a convenient size to use. Only rarely is it completely inserted. We locate the site of injection in the horse by running the finger down the contour of the croup until we come to the first evident depression between spines. Counting the spines from the first sacral backwards enables one to recognize the first intercoccygeal space with certainty. The animal usually offers less resistance to the operation if a few cubic centimeters of anesthetic, enough to

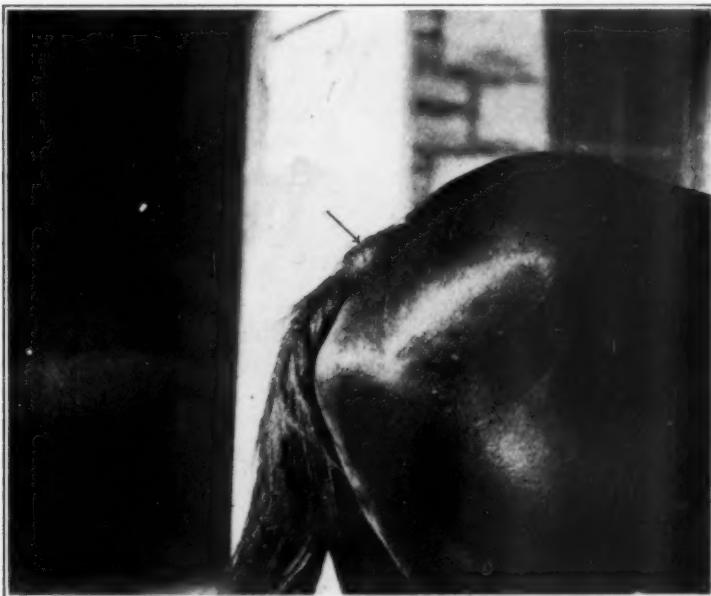


FIG. 3. Position and direction of the needle for epidural injection.

produce a distinct wheal, are injected subcutaneously. The needle is inserted near the center of the depression and given a slant of about forty-five degrees to the plane of support. It is essential that the needle be started and kept in the median plane of the body. Occasionally it is necessary to change the slant of the needle, due to striking the edge of the vertebra before entering the canal. Approximately two-thirds of the length is inserted. On injecting the fluid very little force, other than that necessary to operate the syringe, is needed. One has the sensation that the injection is being made into another fluid or into space.

In the cow the injection is made also through the first intercoccygeal space, although it is possible to use the interval between the sacrum and first coccygeal vertebra. We locate this area by placing the thumb and the middle finger on either side and the index finger along the dorsal border of the tail and then move this appendage with the free hand. The first coccygeal vertebra moves but little on the sacrum, while the second vertebra is more freely movable. One may also bend the tail sharply upward. The sharpest part of the bend indicates the first intercoccygeal space. It is rarely possible to give the needle more

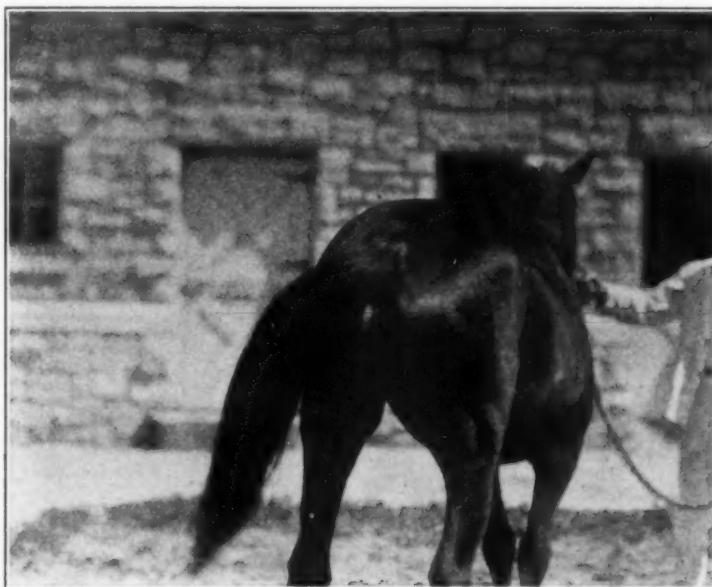


FIG. 4. The first noticeable indication of epidural anesthesia. Note the lack of motion at the base of the tail.

than about fifteen degrees slant. Some operators prefer to keep the needle in nearly a vertical position.

We have had some failures in both the horse and the cow which were due, no doubt, to faulty technic. If a sufficient quantity of anesthetic of the proper strength is injected into the canal we feel sure anesthesia will follow.

In closing, we wish to express our appreciation to Dr. R. R. Dykstra for his constructive criticism and encouragement and to Dr. J. H. Burt for the use of anatomical subjects.

EXPERIMENTAL AND CASE REPORTS

Experiment 1: Aged bay mare, of about 1200 pounds weight. Sixty cc of a 2 per cent dulcene solution injected into the sacral canal. The mare was headed down a steep incline. The opinion of several surgeons was that the slope of the sacral canal made this type of anesthesia impossible in the horse. In five minutes the animal began to lose control of the hind legs and almost immediately went down. After several unsuccessful attempts to rise she ceased to struggle. The loss of sensation and motor reflex was complete and extended as far forward as the ilio-

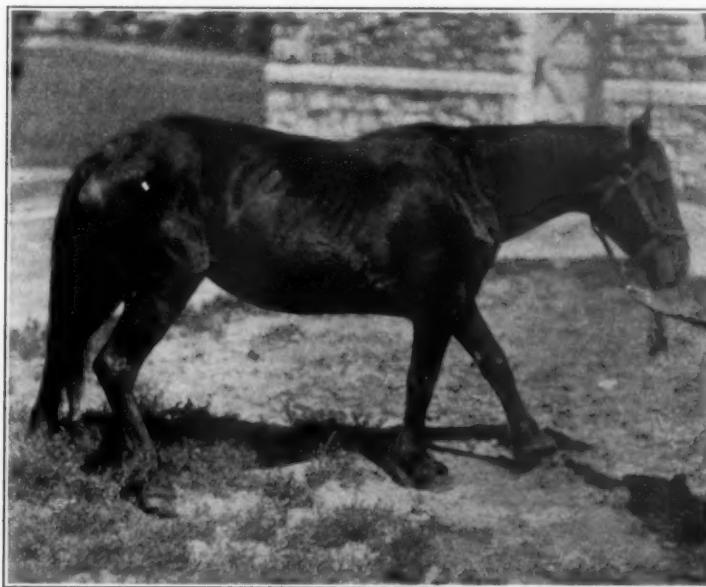


FIG. 5. A further stage of epidural anesthesia. The tail is motionless although the flies were bad. The mare is having some difficulty in standing.

lumbar nerve. In about two and one-half hours sensation began to return and in three hours, with some assistance, the mare got on her feet and walked to her box.

Experiment 2: Aged gray mare, of about 900 pounds weight. Thirty cc of a 1 per cent dulcene solution injected into the sacral canal. In twenty minutes ovariectomy was performed with no restraint except the stocks. The mare remained standing without difficulty, but moved with an unsteady gait.

Experiment 3: Ten-year-old sorrel stallion, of about 800 pounds weight. Fifteen cc of a 2 per cent dulcene solution injected at

the first intercoccygeal space. In four minutes the base of the tail was motionless and in ten minutes the entire tail was anesthetized. The anesthesia involved a small area around the base of the tail and the perineum, as well as the tail itself.

Hospital case 1375: Jersey cow in the sixth month of gestation. The owner found the cow in the pasture with a pronounced prolapse of the vagina. On examination a diagnosis of vaginal cystocele was made. The bladder, which was filled with urine, was emptied and returned to normal location. However, when the cow was started to the barn, the prolapse recurred. She was brought to the hospital. Thirty cc of a 1 per cent dulcene solution was injected into the sacral canal, the vagina packed and the vulva sutured. The epidural anesthesia completely checked the straining. The pack was removed after twenty-four hours. Recovery was uneventful.

REFERENCES

- Labet: Regional Anesthesia.
Sisson, S.: The Anatomy of the Domestic Animals (2nd ed.; W. B. Saunders Co., Philadelphia, 1914).

DR. HOLLINGWORTH HONORED

Dr. W. G. Hollingworth, of Utica, N. Y., was elected president of the Dairy and Milk Inspectors' Association of New York at the recent meeting of this organization. Dr. Hollingworth is very anxious to see the membership enlarged and would like all veterinarians in New York State, who are engaged in food inspection work, to join the Association. The necessary application blanks can be secured by communicating with Dr. Hollingworth in care of the Bureau of Health, Department of Public Safety, Utica, N. Y.

PARATHORMONE

The ancients who used various portions of animals in their medical needs were not so far off after all and when we, of this age, think of the number of curative substances we are extracting from this or that gland we must marvel. Another such remedy is an extract containing the parathyroid hormone and it is extracted very much like insulin. Parathormone contains the active principle of the parathyroid glands of cattle and is said to have the properties of relieving the symptoms of parathyroid tetany and of increasing the calcium content of the blood serum.

—*Bulletin of Pharmacy.*

REGIONAL ANESTHESIA IN THE DOG AND CAT

By E. R. FRANK, Manhattan, Kansas

Department of Surgery and Medicine, Division of Veterinary Medicine, Kansas State Agriculture College.

Regional anesthesia is the result of a certain number of delicate surgical procedures by which it is possible to control pain temporarily, in interrupting the sensory nerve conductivity of any region of the body.

Regional anesthesia is best realized by injecting an anesthetic solution in the immediate vicinity of the nerves supplying the operative field. It is commonly called local anesthesia but it differs from local anesthesia in that the anesthetic fluid is never injected along the line of incision or within the structures of the surgical wound. Blocking the nerve-trunks within the spine but outside the dura mater is called "epidural," "extradural" or "caudal block."

The practice of regional anesthesia is an art, as it requires special knowledge of anatomy and skill in its application. Regional anesthesia in the dog and cat is of greatest advantage to the practitioner who does not have a trained assistant to give a general anesthetic.

It is unnecessary to lay stress on the importance of asepsis. The operative field should be prepared as for any surgical act.

Glass syringes of five and ten cubic centimeters capacity are preferred, as they are convenient to handle and easily sterilized. Needles from two to three inches long and twenty gauge are preferred. Procain has been the preferred anesthetic used, because it has a low degree of toxicity and is constant and certain in its action. It is not irritating to the tissues and is rapidly and completely absorbed locally. The addition of adrenalin chlorid to a solution of procain hastens and intensifies the action of the drug and lengthens the duration of the anesthesia.

Procain dissolved in a normal salt solution to the extent of two per cent is used for epidural anesthesia. Analgesia begins almost immediately after the injection and lasts from two to three hours. Surgical anesthesia starts ordinarily from ten to fifteen minutes after the injection and lasts from an hour to an hour and a half. If it is desired to prolong or intensify the anesthesia,

Received for publication, August 23, 1927.

adrenalin chlorid (1-1000) may be added to the anesthetic solution at the rate of eight drops of the adrenalin solution to one hundred cubic centimeters of the anesthetic solution.

TECHNIC FOR REGIONAL ANESTHESIA

Epidural block in the dog consists in passing the needle through the interspace between the last lumbar vertebra and the sacrum and depositing the anesthetic within the sacral canal and outside the dura mater. The spinal cord terminates about one-half inch anterior to this space, so there is no danger of injuring the cord.

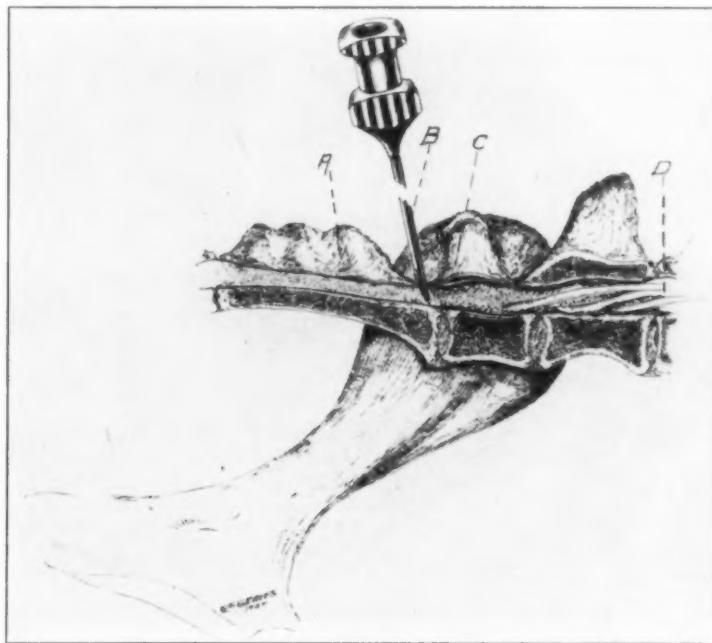


FIG. 1. Anatomical structures involved in the dog. A, sacrum; B, needle; C, last lumbar vertebra; D, termination of spinal cord.

Figure 1 illustrates in a diagrammatic manner the structures involved. The needle is in proper position for injecting the fluid. The point of the needle is in the canal, having passed through the interspace between the sacrum and last lumbar vertebra.

The point to insert the needle may be located by palpating for the depression just anterior to the first sacral vertebra. Or the depression may be located on a line drawn transversely across from the posterior borders of the wings of the ilium. It is

preferred that the animal remain in the standing position, so that the anatomical structures will be in a normal position.

A non-sensitive wheal in the skin at the point of injection is made, by injecting a small amount of anesthetic solution within the epidermis. The needle should be inserted exactly in the center of the depression and tilted slightly backward. The depth that the needle will have to be inserted will vary from one-half inch in small dogs to two inches in the larger dogs. The operator can usually tell when the point of the needle has entered the canal, as the animal will wince with pain, or after some experience the operator will get the "feel." It is very easy to



FIG. 2. Characteristic position during complete epidural anesthesia.

miss the canal if the needle is not inserted exactly in the center of the depression.

The solution should be injected slowly, as the patient may show some reaction if it is injected too rapidly. The amount of solution to be injected will vary from 5 cc in a large fox terrier to 12 cc in a 50-pound dog and 20 cc in a 100-pound dog. The injection of the anesthetic fluid into the sacral canal requires no pressure and imparts the impression of being made into a free space or into another fluid.

After the anesthetic is injected the dog should be held in dorsal recumbency and the posterior parts elevated for a few minutes

so that the anesthetic fluid will gravitate forward and anesthetize the sensory nerves supplying the abdominal cavity. When anesthesia is complete, there will be paralysis of the posterior extremities and relaxation of the abdominal muscles. Any operation may be performed in the abdominal cavity or the parts posterior with perfect anesthesia.

FOR OPERATIONS ONLY ON THE TAIL

Caudectomy: Anesthesia of the tail may be produced in mature dogs by injecting one cubic centimeter of a one per cent procain solution epidurally. After injecting the solution, the dog should



FIG. 3. Castration of unrestrained dog following epidural anesthesia.

be made to sit down so that the solution will remain in the posterior part of the canal. Anesthesia is usually complete in three minutes, so that any operation may be performed on the tail. For puppies one-half cubic centimeter of a one per cent solution is usually sufficient.

REGIONAL ANESTHESIA IN THE CAT

Regional anesthesia in the cat is accomplished in the same manner as in the dog. The landmarks for finding the point of injection are the same as in the dog. The depth the needle will

have to be inserted will vary from one-half to three-quarters of an inch.

Three cubic centimeters of a two per cent procain solution is used for mature cats. For younger animals the amount of solution used will vary according to the size of the animal. After the injection has been made, the patient is placed in dorsal recumbency and the posterior parts elevated for a few minutes. Anesthesia is usually complete in ten minutes so that any operation may be performed in the abdominal cavity.

It will be necessary for the inexperienced operator to practice on several animals before he will be able to insert the needle in the spinal canal with any uniform degree of success.

Up to date no unfavorable sequelae have been noted following the use of epidural anesthesia in small animals.

REFERENCE

Labat: *Regional Anesthesia, Its Technic and Clinical Application.*

EXAMINATION FOR JUNIOR VETERINARIAN

The United States Civil Service Commission announces an open competitive examination for junior veterinarian to fill vacancies in the Bureau of Animal Industry, Department of Agriculture, for duty in the field, and in positions requiring similar qualifications. The entrance salary is \$1,860 a year. A probationary period of six months is required; advancement after that depends upon individual efficiency, increased usefulness, and the occurrence of vacancies in higher positions.

Applicants must have been graduated from a veterinary college of recognized standing, or must be senior students in such an institution and furnish proof of graduation during the existence of the eligible register resulting from this examination; provided, that the names of senior students who pass the examination will not be certified for appointment until they have furnished proof of actual graduation.

Competitors will be rated on veterinary anatomy and physiology, veterinary pathology and meat inspection, and the theory and practice of veterinary medicine.

Full information may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the United States civil service board of examiners at the post office or customhouse in any city.

Applications must be on file not later than December 30. The examinations will be held about ten days later. Applicants will be notified of the exact date.

BOVINE INFECTIOUS ABORTION*

By PROF. DR. B. BANG, Copenhagen, Denmark

It will soon be thirty-two years since I first saw the *Bacillus abortus* (or *Brucella abortus*). It was the 19th of December, 1895, and the next summer I and my assistant, Mr. Valdemar Stribolt, had the great pleasure to call forth typical abortion in two pregnant cows, in whose vaginas we deposited a pure culture of our bacillus seventy-three days before. Later on we had the same result by intravenous injection of the culture and by giving it through the mouth. I published our results in the Danish language at a veterinary meeting in Copenhagen, in June, 1896, and the following year I wrote a paper on it for a German veterinary journal and the same was published in English in M'Fadyean's journal.

It took some years before these researches were taken up and verified in other countries, first in England (M'Fadyean and Stockman), later in the United States and in Germany, but nowadays we know that the disease, caused by our bacillus, probably exists in all civilized countries and it is commonly admitted that the bacillus, to which you as a rule give my name, is the chief cause of the bovine infectious abortion, a disease which in many countries is considered the greatest scourge among cattle.

I feel it a great honor that you, my colleagues, have invited me to deliver an address on this disease, but as it for many years has been the object of deep-going researches—not the least in your country—you of course cannot expect that I, now an old man and not working any more in a laboratory, should be able to tell you anything new about the disease. I do not like to try to carry coals to Newcastle and I shall essentially restrain myself to some remarks on what we are to do in order to combat the disease.

Of prime importance for prophylaxis is the *knowledge of the cause of the disease*. The farmer whose herd is free from abortion cannot be too careful to avoid any communication between his cattle and infected ones. It is not enough to avoid taking into his herd an animal, coming from an infected herd; he must also avoid the use of common pastures, where there might possibly

*Presented at the sixty-fourth annual meeting of the American Veterinary Medical Association, Philadelphia, Pa., September 13-16, 1927.

be infected animals, and to let his cows be served by a strange bull and let his own bull serve strange cows. If he has to take into his herd an animal of whose soundness he has no certainty, he must keep it carefully separated until two blood tests, made with an interval of one, or better, two months, have proved the absence of antibodies.

When a cow aborts in a hitherto healthy herd, the owner ought not to think that it is an accidental miscarriage caused by trauma, noxious food or some disease. Such cases exist but most cases of abortion are infectious and most frequently caused by my bacillus. It is therefore most reasonable to suppose this to be the case and take measures in order to avoid spreading of the contagion. If the expulsion of the fetus is accompanied by a discharge of a dirty, muddy but odorless liquid, the infectious nature is highly probable. This discharge should be examined, as well as the blood of the cow.

CORRECT DIAGNOSIS IMPORTANT

It is of the greatest importance to get a correct diagnosis of the first case of abortion which is observed in a herd, because the discharge from the womb spreads many millions of the bacilli in the stable and by means of brooms and boots they may easily soil the fodder and be eaten by pregnant cows. I think it is commonly admitted, that food is the most common carrier of the infection, although the bacilli also are able to enter the body through the genital organs and probably through all mucous membranes, as it has been proved for the conjunctiva and for the canals in the udder. The bull may also become infected through the discharge, which is spread in the stable. It is therefore highly important that the farmer or the herdsman carefully observe the pregnant cows. He will then generally be able to observe, some days before the abortion, the well-known symptoms of an approaching abortion and be enabled to remove the cow to another room (maternity stall or eventually the horse stable) before the uterus has been opened. This is indeed the most important prophylactic measure and this, of course, should be done in all cases of impending abortion (not only in the first case). If this has not been done and the cow aborts in the stable, she should nevertheless be removed from the stable as soon as possible, because infectious bacilli will be discharged from the vagina the following days also.

The place for the cow and the surrounding parts of the stable should, of course, be carefully cleaned and disinfected. The aborted fetus must be removed and buried or burned. The afterbirth should be taken away and the uterus cleaned, eventually treated with iodin solution. The cow should not come back to the stable before three months after the abortion and should not be served before. If these measures are carefully carried out, it will in many cases be possible to stop the disease and avoid its spreading to other pregnant cows and to have the cow bring forth at time next year.

THE BULL A FACTOR

Of other prophylactic measures I mentioned caution regarding the bull. Formerly I laid great stress on the part the bull might play in spreading the disease. Most modern authors do not believe this to be right, but all, I think, agree that it happens sometimes. At first I supposed that the bull might transfer the bacilli by means of his penis, which had been soiled with the bacilli by serving a cow which had aborted. The possibility thereof cannot be denied but it does not seem to play an important part; it may nevertheless still be wise to disinfect the preputial sac when the bull has covered a cow that is supposed to have aborted recently. Of much more importance, no doubt, is the fact that the bull sometimes is really infected and has inflammatory processes, containing the bacilli, in the genital organs (seminal vesicles and testes). How frequent such lesions occur is not sufficiently known. I think they are not very rare. It is, for example, not a great rarity to find the peculiar necrotic orchitis which nowadays has been proved to be caused by abortion bacilli. I saw these small bacilli many years ago, without thinking of the possibility that they had something to do with abortion. The many practical observations of spreading of abortion by means of some bull might be explained by the existence of chronic abortion inflammation in the genital organs.

There is, in my opinion, no doubt that much can be done against the abortion by the simple prophylactic measures I have mentioned, but it is quite natural that scientists nowadays lay great stress on the agglutination test (or complement-fixation test) as a valuable means in the struggle against the disease. A positive result of the test gives us an early diagnosis. It has the drawback that it tells us only that the animal has been exposed to contagion but cannot tell us if the cow will really

abort. In this there is indeed an analogy to the tuberculin reaction, which does not indicate either that the animal will really be sick with tuberculosis.

PENNSYLVANIA PLAN COMMENDED

The well-known Pennsylvania plan for combating abortion has striking analogy to my old plan for combating tuberculosis, in that it demands an agglutination test for the whole herd and separation of the reacting animals from the healthy ones. If the abortion is widely spread in the herd, a method is recommended corresponding to my modified plan, namely the foundation of a new healthy herd by separation of the calves. I think, of course, that the plan is very good and I shall be very interested to know how it might be accomplished. A similar plan has begun to be carried into action in some herds in Denmark, proposed by Mr. A. Thomsen, and the preliminary reports seem to be rather promising.

As far as I understand, Pennsylvania demands notification of all cases of bovine infectious abortion, but otherwise this does not seem to be commonly ordered. Therefore, it may perhaps be of some interest for you to know that Norway and Denmark also have entered upon that way. Norway already in 1903 proclaimed it to be a reportable disease and prohibited sending animals affected with this disease to markets, shows and into other persons' herds or pastures, and in 1907 it was decided that this should refer to all animals coming from an infected herd even if they were not evidently attacked. It was permitted to sell such animals to slaughter under severe control. Bulls from an infected herd were not allowed to serve cows from a healthy herd and vice versa. Special care was taken of cows adrift for sale, a method common in Norway.

Since 1912 the veterinary laboratory of the State offers to make gratuitous tests of blood and of suspected afterbirth and especially the blood tests have been highly appreciated by the farmers and are commonly used. If the test is positive, the animal is declared infected.

ABORTION REPORTABLE IN DENMARK

In Denmark it was first at the revision of our law on contagious animal diseases, in 1920, that contagious abortion was included in the law. According to the law the farmer is bound to call in the veterinarian in any case when a cow aborted under symptoms

which make the case suspected to be a contagious one. If the veterinarian finds the case suspicious, he shall try to get a correct diagnosis by sending some fresh cotyledons and a sample of the cow's blood to the state laboratory and when the laboratory declares it to be a case of contagious abortion the veterinarian shall give the farmer a copy of a paper describing the nature of the disease and what is to be done in order to combat it (a "Merkblatt," as the Germans say). The farmer is now forbidden (1) to send his bulls, his pregnant cows or heifers or cows with vaginal discharge to common pastures or to shows; (2) to sell bulls or pregnant animals for other purposes than slaughter without telling the buyer that the animal comes from an infected herd; (3) to let his bull serve cows from healthy herds and to send his cows or heifers to a bull, owned by an association; (4) to let his cows or heifers come to another person's bull without telling this man that the animals come from an infected herd.

DANISH LAW AMENDED

No doubt these regulations have had the good result in wide circles to spread knowledge of the nature of the disease and of the means of combating it and, on the whole, to teach people to take care not to spread the infection to other people's herds. But they have at the same time awakened not a little displeasure, especially among owners of large herds, in which the disease has often a relatively mild character in so far as only heifers and newly bought animals abort. Such people usually do not understand the necessity of forbidding exhibition of their fine cattle at shows. This fact and the unhappy circumstance that Denmark just now is a poor country (especially on account of our very high taxes), for which reason many considered it too hard that the State had to pay a rather large sum to the veterinarians for controlling the outbreak of the disease, have recently led Parliament to amend our law so that the veterinarians are no longer paid by the State for visits to examine outbreaks in hitherto apparently healthy herds. At first this was supposed to denote a great step backward but fortunately this does not seem to be the case. The new law has the same regulations (almost unchanged except as regards shows) as the old one, and they are enforced if it is not proved by means of a gratuitous examination in the laboratory that it is not a case of infectious abortion. It is very essential that the veterinarian is obliged to tell the owner that according to the law about purchase and sale he is liable to give com-

pensation if he is proved to have infected another person's herd. It is indeed a very common thing to claim (often very high) compensation in such cases and this is apt to attract the owner's attention to take care to have his herd completely free from the disease.

In Norway there is nowadays a very great interest among the farmers for combating the infectious abortion. At the State laboratory 25,000 to 30,000 blood tests are yearly examined, and farmers' associations recently requested the government to make the control more rigorous, especially regarding the sale of animals from infected herds and the use of common pastures, a question which, in a mountainous country such as Norway, is a very difficult one. There is no doubt that pastures play a very great part in spreading the disease. Happily in Norway they do not seem to be so apprehensive of public expenses as the Danish government is at present.

IMMUNIZATION BEING STUDIED

I may say some words about the immunization against infectious abortion although I know that at present this question has very little interest for you. In Europe it is much more discussed. I think I was the first who many years ago made some experiments with it and nowadays it plays a rather great role in England and Germany. In Denmark during recent years it has been taken up by my son, Oluf Bang. He has had the same results as most other investigators. Killed bacilli have only little effect, but living bacilli, injected subcutaneously in a dose of 10 cc, two times, with an interval of two to three weeks, not later than two months before the cow shall be served, has evidently given some degree of immunity. There is, of course, the drawback that the bacilli may be deposited in the udder and continue to live there, but that does not seem to play any great part when used only in highly infected herds. I think that your method of combating the disease, by *agglutination test and separation*, must be the best, where it can be accomplished, but it seems to me that there must be room for vaccination in highly affected herds.

TUBERCULOUS ABORTION IN CATTLE

Finally I wish to mention the interesting researches on the relatively frequent occurrence of *tuberculous abortion in cattle*, published by my former assistant, Dr. N. Plum. I saw the first case a couple of years ago and I was greatly surprised to observe

that it was impossible with the naked eye to distinguish between the afterbirth from such a case and one from a common case of infectious abortion. As I later on found a new case of the same kind, I told Dr. Plum to examine for tuberculosis in all cases in which he could not find abortion bacilli in the afterbirth of supposed aborters, sent to my laboratory for control. In a few years he found in my laboratory (and later in Professor Jensen's) a very great number of tuberculous abortions, namely 250 up to 1925, *i. e.*, in about 2 per cent of the cases of abortion examined at the laboratory. As one of Dr. Plum's treatises has been translated for the JOURNAL of your association (July, 1926), I need not go into detail. I shall mention only that most of the cases of tuberculous abortion were of course due to *bovine* bacilli, but that not so very few (6 out of 152) were caused by infection with *avian* bacilli. In these cases tuberculous lesions were mostly found in the uterus of the cow and usually only as small abscesses.

In finishing I wish to express my sincere admiration for the numerous excellent deep-going researches on infectious abortion which have been made in your country. Your scientists have indeed for many years been in the fore front in this field. In congratulating you with my whole heart I express the hope that the energetic attempts you make to eradicate this disastrous disease may be crowned with success.

BUREAU TRANSFERS

Dr. J. M. Young, from Brooklyn, N. Y., to New York, N. Y., on meat inspection.

Dr. G. A. Bostrom (Chi. '20), from Spokane, Wash., to Lincoln, Nebr.

Dr. Thomas K. Jones (Chi. '18), from Chicago, Ill., to Des Moines, Iowa, on tuberculosis eradication.

Dr. Edgar Heiny (Ind. '08), from Birmingham, Ala., to Baton Rouge, La., on tick eradication.

Dr. Nelson D. Hatcher (St. Jos. '20), from Jacksonville, Fla., to Baton Rouge, La.

Dr. Walter W. Shartle (Ind. '09), from Birmingham, Ala., to Houston, Texas, on tick eradication.

Dr. Joseph M. Jehle (Chi. '11), from Chicago, Ill., to LaFayette, Ind., in charge of meat inspection.

Dr. Charles H. Herrold (O. S. U. '04-McK. '05), from LaFayette, Ind., to Dayton, Ohio, in charge of meat inspection.

Dr. Robert W. Culbert (McK. '08), from Indianapolis, Ind., to Baltimore, Md., in charge of meat inspection.

Dr. Russell A. Atehley (U. P. '18), from Harrisburg, Pa., to Albany, N. Y., on tuberculosis eradication.

Dr. Ellery M. Aldrich (U. P. '13), from Albany, N. Y., to Boston, Mass., on tuberculosis eradication.

Dr. Arthur N. Smith (U. P. '07), from Portland, Me., to New York, N. Y., on meat inspection.

SOME OBSERVATIONS ON THE USE OF STREPTOCOCUS BACTERIN IN THE PREVENTION AND TREATMENT OF MASTITIS OF COWS*

By JOHN P. TURNER, *Washington, D. C.*

Mastitis causes a loss to the dairy industry closely approximating tuberculosis and abortion disease, due to the total or partial destruction of the udder. That the study of this disease has been neglected in proportion to its importance may be observed by noting how studiously its consideration has been avoided in modern textbooks on veterinary medicine.

The losses are greater in large herds, due to the assembling of cows, for the same reason that outbreaks of disease occur whenever numbers of men are assembled, as in military camps. In large herds, too, the same close observation of cows cannot be maintained as in small herds. Furthermore, in the herd under consideration the fact that no natural pasturage is available is added as a disease-producing factor to that of the assemblage of large numbers of animals, although this was partially offset by providing adequate exercise-yards. The writer wishes to express his opinion on the marked advantage existing where there are natural grazing conditions.

The herd in which this bacterin is being used is a federal herd, averaging 225 cows. These cows are large, high-grade Holstein Friesians, averaging about 10,000 pounds of milk a year, so that it is a hard-working herd. The feed consists of corn meal, bran, middlings, cottonseed, linseed meal and ground oats. The roughage consists of soiling crops in season (wheat, oats, Sudan grass and corn), supplemented by corn ensilage throughout the year, and beet pulp.

The herd is free of tuberculosis and abortion disease. It is maintained by raising from fifty to sixty heifers a year; only four heifers and three cows have been purchased since 1912, these coming from accredited herds, subject to the agglutination test. Bulls are purchased, always under one year of age, and are similarly tested.

Mastitis has never developed to an alarming degree in this herd, but more or less of it is present at all times. For instance, thirty-seven cows were sold in 1926 as unprofitable or undesir-

*Presented at the sixty-fourth annual meeting of the American Veterinary Medical Association, Philadelphia, Pa., September 13-16, 1927.

able, of which fourteen (37 per cent) had mastitis. To Sept. 1, 1927, 35 unprofitable cows have been sold, of which 13 (37 per cent) had mastitis. The practice in this herd has been to segregate mastitis cases, eliminate the grain ration and administer a saline purge followed by salicylate of soda and boric acid twice daily.

The udders are stripped as frequently as possible and hot water fomentations applied to those cases showing enlarged and painful udders. Catarrhal cases showing nothing but slugs are not fomented. The results with this line of treatment have been but fairly satisfactory; a very large percentage of cases simply showing "slugs" recovered, but frequently had re-attacks; those showing swellings and marked change in the character of the milk did not recover to such a degree that we could boast of our efforts. Quite a large number of cases lost a quarter of the udder and continued to be fairly profitable cows but, where half the udder was involved, the cows were generally disposed of.

Early in 1927 a bacteriological study was made of the milk from all mastitis cases. Cultures of milk from infected udders in this herd have, with few exceptions, given a long-chain streptococcus in pure culture; this streptococcus did not hemolize human or cow blood, nor give green coloration on blood-agar.

A bacterin was made of three strains isolated from acute infections. These strains were kept upon enriched media. They were originally grown in brain broth; they were plated on blood-agar and finally grown in beef-infusion broths for the preparation of the bacterin. This was done in the hope of retaining the pathogenic variants. The bacterin was made up to the strength of two thousand million organisms for each cubic centimeter. The dose administered was five cubic centimeters or ten thousand million organisms.

The sera of three cows which had received the course of bacterin treatment gave an agglutination titre of 1 to 620, 1 to 160 and 1 to 40.

It was decided in March, 1927, to begin vaccinating all cows during the "drying off" period, which is usually from one to two months prior to parturition. During this period the dry cows were given five cubic centimeters of this bacterin every three days until they had received six doses. There was little or no general reaction and but a slight local edema in a few cases following injections. There was no specific reason to give

this number of injections, save that it was thought an immunity could be gradually developed.

Due to the fact that high-producing cows develop greatly enlarged udders and that frequently this exaggerated physiological condition becomes pathological, it was thought advisable to attempt immunization just prior to parturition.

From March 7, 1927, to September 1, 1927, sixty-seven cows have been given this course of injections of bacterin made from streptococci. Of this number thirty-nine have "freshened." The results to date are that four cows of those vaccinated have developed mastitis, two of which recovered promptly; one has been sold as incurable and the fourth is being kept in hope of eventual recovery, as she is a valuable cow.

Table I shows the number of cow, dates of injection with bacterin, date of development of mastitis and results of this treatment as a curative agent.

TABLE I—*Records of four cows injected with bacterin, March 3-28, 1927*

COW	DATE OF ATTACK OF MASTITIS	CHARACTER OF ATTACK	INJECTIONS FOR CURATIVE PURPOSES	RESULTS
862	1927 July 13	Two quarters. Milk pus-like and full of slugs	22	Recovering slowly. Both streptococcus and staphylococcus in clature. Used mixed bacterin.
995	July 13	Slugs from all teats; bad	7	Recovered
2	July 13	Slugs from teats	6	Had two re-attacks but recovered
936	August 4	Two quarters badly swollen. Slugs. Other two quarters dried	4	Sold. Staphylococcus found in culture. Incurable

Four (10 per cent) of the vaccinated cows which have freshened have developed mastitis and three of those affected have recovered and one was sold as incurable. During this period the cows shown in table II, not given immunizing injections of bacterin, developed mastitis and were treated with streptococcus bacterin.

From this table it will be noted that twenty cases of mastitis occurred among 153 cows (13 per cent) that had not been vaccinated with bacterin prior to calving. Of this number sixteen

recovered, three were sold as incurable and one lost a quarter of the udder.

Many of these cases were not serious, as will be observed from an examination of table II. It is unfortunate that these observa-

TABLE II—*Records of unvaccinated cows which developed mastitis*

COW	DATE OF ATTACK	CHARACTER OF ATTACK	INJECTIONS OF BACTERIN FOR CURATIVE PURPOSES	RESULTS
928	June 30	Watery secretion, one teat	5	Recovered
951	June 30	Slugs from all teats	13	Incurable. Sold
870	June 30	Slugs, one teat	2	Recovered
660	June 30	Spider. Left hind teat badly involved. Teat closed. Attendant used milk-tube. Quarter ruined	7	Lost one quarter
902	July 1	Slugs, two teats	6	Recovered
981	July 11	Slugs and watery secretion, one teat	4	Recovered
970	July 11	Slugs, one teat	6	Recovered
967	July 11	Slugs, two teats	5	Recovered
*1095	July 11	One quarter badly swollen, developed abscess, quarter destroyed	11	Incurable. Sold
1067	July 11	Slugs, two teats	4	Recovered
736	July 14	Slugs and watery secretion, two teats	2	Recovered
823	July 16	Slugs, one teat	6	Recovered. Re-attack. Given two more injections. Recovered
1030	April 25	Slugs and watery secretion, two teats	13	Incurable. Sold
*861	July 23	Slugs and pus, two teats	6	Recovered. Re-attack, 8-17. Recovered
*1064	July 23	Slugs, one teat	3	Recovered
*800	July 25	Slugs, two teats	2	Recovered
†1065	July 25	Slugs, one teat	3	Recovered
*960	July 25	Slugs, one teat	2	Recovered
*963	July 28	Slugs and watery secretion, two teats	4	Recovered. Used 50 cc calf serum first day of attack
1059	August 1	Bloody secretion, one teat	2	Recovered

*Streptococcus found in discharge of teats.

†Staphylococcus found in discharge of teats.

tions have not extended over one complete lactation period of the herd and that part of the herd was not used as a check.

It was simply a herd effort to control mastitis. Suffice to say, the work will be continued until a year's test has been made of the practicability of herd autogenous bacterin.

CONCLUSIONS

The use of streptococcus bacterin, prior to parturition, has been highly successful in preventing the development of those enormously distended udders occurring so frequently among high producers, which frequently develop mastitis. To date thirty-nine cows thus treated have calved without any of them developing this type of udder. The udders have been full, well developed but soft and pliable. This alone has repaid my efforts.

As a curative treatment I am encouraged by its use. Twenty-four cases of mastitis of all degrees developed during June, July and August, 1927. These were given bacterin treatment; an average of six doses. Of these twenty-four cases, eighteen recovered, four were sold as incurable, one lost a quarter of the udder and is retained in the herd, being a valuable cow. Another cow, showing a double infection with a streptococcus and a staphylococcus, is recovering slowly, a mixed bacterin being used as treatment.

I have as yet insufficient data to indicate the value of this bacterin as a prophylactic measure. Of thirty-nine cows that have calved since vaccination, four (approximately 10 per cent) have had mastitis. These cases did not develop until four months after vaccination. They occurred during an epidemic of summer mastitis in the herd, at which time there was an incidence of 13 per cent among the cows that had not been vaccinated.

DISCUSSION

DR. T. H. FERGUSON: I am sorry I did not have an opportunity to hear the first part of the paper. What I heard was very interesting, especially the discussion of feeding and the bacterin treatment of mastitis.

This summer I had the privilege of running a test on five herds of cows with a bacterin made in New Zealand. We examined every cow in each herd, took a sample of the milk in a glass before making the first injection, and got a complete history of each animal in the herd. We kept close track of the results. The treatment consisted of three injections, a week apart. I made a report for these people and we found that their bacterin treatment had some value, but in contrast to autogenous bacterins it did not have the same value, in our experience.

It has been our custom in pure-bred herds to follow the treatment that the author recommended relative to autogenous bacterins. We would first take a sample of each cow's milk and find how badly infected the herd was; then we would take some samples from the cows that seemed to be the worst infected, and find out what was causing the mastitis. We found that, if it was streptococci and we had autogenous bacterins made and they were given frequently during the milking period, and other precautions were respected, they seemed to do a lot of good. On the other hand, we found that cows infected with organisms that cause chronic septicemia, manifested in the general appearance of the animal by symptoms like staring coat and a hide-bound condition, and that class of mastitis that is caused by the staphylococci, did not do well.

We obtained the best results from using autogenous bacterins made from the streptococci. In addition to that we always outline a system for handling

of these heavy-uddered cows, to protect their udders from internal injuries and contact with mud puddles, driving them any distance when their udders are beginning to make up, and so forth. There is, in a good many of these cases, a time when there is a lack of balance between the lymphatic and blood circulations. That seems to be a pretty critical time with a cow, when her udder is edematous and for a few days the swelling is intense. We are careful about that cow's diet at such a time and about driving her or moving her very much. We put such cows on a laxative diet and keep them in comfortable quarters, and I can say from considerable experience with autogenous bacterins that it seems to be a very good treatment. I noticed particularly the fact that cows that did develop a slight mastitis, manifested by a slug in one or more teats, responded to ordinary treatment or a few injections of the same autogenous herd bacterin that we were using and cleared up promptly, whereas in other herds, possibly where we were not using that kind of treatment, similar cases would drag along and bother us more or less, very often with the loss of the affected quarter, and sometimes the half, so that in order to save the cow it would require the removal of half of the udder or possibly the affected quarter would slough and have to be removed, after there was a line of demarcation so that it could be taken away by ligating the blood-vessels only.

I think this is a wonderfully good paper and I believe that the author's experiments indicate that this treatment is a sheet anchor for us in handling infectious mastitis.

DR. A. T. KINSLEY: What is the influence of the milking-machine in the production of mastitis? Since January 1, we have been privileged to observe one herd that has been quite interesting, a herd of 160 cows. In January there were introduced two pure-bred Holsteins, heavy milkers. Within three weeks after their introduction several cases of mastitis developed. All the cases that developed were in relation to these two particular cows that had been introduced. The infection seemed to spread from them along the line of the milking-machine.

Since that time 40 cows have been taken out of that herd; approximately 30 have been returned. The first examination of milk showed streptococci. On a closer examination—guinea pig inoculation—in nearly every instance there has been found the staphylococcus; in a few cases, the colon bacillus. It is difficult to eliminate contaminations and the colon bacilli absolutely, but apparently the staphylococcus is an important factor in the intensive mastitis cases in this herd. In relation to that it may be said that extending over a territory of at least 200 miles there have been numerous reports of fatal mastitis in cows during the last six months and in nearly all of those cases it has been found that the staphylococci are apparently the important factor. Whether or not some other organisms are being overlooked, I do not know, and I would particularly like to know whether it is deemed possible to clean up a herd that is affected with mastitis and continue to use a milking-machine.

DR. FERGUSON: I have had considerable experience in investigating udder troubles in herds where milking-machines were used; especially herds that were being handled for dairy purposes, that is, supplying milk to cities, and I find in my experience that, if a milking-machine is mechanically right and there is no infection in the herd and the milking-machine is handled properly, relative to cleanliness and so forth, it does not cause mastitis, but the teat-cup is the closest contact that you get in milking. It is much closer than the hand and, if you have infection in your herd, it is much more difficult to handle by machine-milking than by hand-milking.

Our plan, where they insist upon using the machine, is to make a thorough examination of the entire herd. We make about three examinations—morning, night and the next morning—and all cows that show any evidence of mastitis by the simple examination as we carry it out—we take a pane of glass and milk a squirt from each teat on the four corners of the glass—giving slugs or anything that is abnormal, are isolated or put in a string by themselves, and those cows are handled and milked by hand. The samples are taken from the worst cases and, if they show streptococci, we have an autogenous bacterin made. Our experience has been that a mixed bacterin does not do much good and, if

the infection is caused from some of the other organisms that, in our experience, have shown us that they cause a kind of chronic mastitis that does not do well with the bacterin treatment, we do not have the bacterin made up. For instance, if the herd were infected with a staphylococcus instead of a streptococcus, we would not bother with a bacterin, but where it was due to the streptococcus we have obtained good results by isolating anything that shows any evidence of mastitis. We do not put the slight cases in the same string with the severe cases, because in handling these herds and milking them it is difficult to get help to respect the sanitary conditions and it is easy to spread disease from the worst cases to the slightly affected cases. Some of these cases that are slightly affected will quite probably get well under proper treatment and care, but the milking-machine teat-cup is the closest contact and for that reason in using a milking-machine one has always to guard against the spread of infection. You have to remember that there is that difference between hand-milking and machine-milking, that you have a closer contact and infection is more easily spread.

DR. F. S. JONES: There are one or two points that perhaps a laboratory man could bring before the practitioner. First of all, a good many cows in these heavily infected dairies carry streptococci in the udder and show no symptoms. Those carriers fall into three groups: First, the cows in the stages of incubation; second, those that have recovered from an attack of mastitis and have not entirely eliminated the streptococcus from the udder; and then a third group which carries the organism and yet has never shown clinical symptoms of the disease.

Now, when you talk about eliminating mastitis from a herd, you have to take this into consideration.

In regard to resistance to udder infection, nature has given two substances that we may speak of as factors in natural resistance. The first is the bactericidal property of cow's milk. If you take fresh, raw milk or milk not heated above 62°C. and inoculate it with a mastitis streptococcus, growth does not take place within four to eight hours. If you boil the same milk, growth begins at once, and in a few hours the plates are overwhelmed. This bactericidal activity of milk is one point. Unfortunately, the dairyman under modern circumstances has rendered this well-nigh inoperative. The period of growth inhibition rarely runs over eight hours, and unfortunately we have this purely arbitrary method of milking twice a day, which has rendered the inhibition more or less inoperative.

There is another factor. Personally, I have never seen a case of streptococcus septicemia in a cow, that I was convinced originated in the udder, for this reason: The mastitis streptococcus will not grow in the blood-serum of cows. This is a second factor of natural resistance.

These are not all. There are probably a great many others which we do not understand.

In an attack of mastitis there is the entrance of the organism and its multiplication. It overcomes the bactericidal activity of the milk and, when the numbers reach a certain point, symptoms develop. As a result of inflammation, there is an increase in the flow of blood-serum through the udder, which is a secondary mechanism for keeping down the number of organisms. By stimulating the antibodies in the blood-serum you may perhaps alter the character of the infection, but so far no one has been successful in actually preventing udder infection by the injection of a vaccine.

The following local from Brush Creek recently appeared in the Flora (Illinois) *Journal Record*:

Some swappin on the creek. One fellow traded a heaver for one that was spring in the knees and off in the hip for a nice old Bill horse. Fred Fatheree and Mark Crawford were called to treat the large hoss and he is almost well now. They are doing a lot of veterinary work on the creek.

NOMENCLATURE OF PATHOGENIC BACTERIA*

By W. A. HAGAN, Ithaca, N. Y.

Department of Pathology and Bacteriology
New York State Veterinary College
Cornell University

The problem of nomenclature of pathogenic bacteria is, of course, no different than that of the nomenclature of other bacteria. This organization is interested primarily in the pathogenic forms and for this reason I have chosen to discuss the question with particular reference to them.

The science of bacteriology owes, in a large measure, its early development to physicians and others who were concerned with the etiology of disease. For the most part these persons, like those of the present day, had little interest in questions of classification and nomenclature of the organisms which they were studying. The term *Bacillus* with them served equally well whether it referred to a spore-bearing or a non-spore-bearing rod, whether the rod was acid-fast or not, whether it was of uniform morphology or pleomorphic, whether it was aerobic or anaerobic. As a consequence of this lack of interest, such classifications as were proposed by those few who interested themselves in bacterial taxonomy received little use. One can search through all of the textbooks on medical and veterinary bacteriology, and most of those on general bacteriology which have been printed in English, without finding more than two or three in which the author has consistently made use of any classification. American textbooks of the last twenty-five years have generally endorsed the classification of Migula when discussing classifications but, when individual organisms are mentioned, few indeed have used the nomenclature of this classification in its entirety. The reason for this, no doubt, is the fact that this would have meant the adoption of names which were not in common use and few authors have cared to do this.

It is not surprising, therefore, that bacteriology at the present time labors under a great handicap because of the lack of a satisfactory nomenclature. The condition has been emphasized in this country in recent years by the attempts of the Society of American Bacteriologists to formulate a more adequate classifi-

*Presented at the sixty-fourth annual meeting of the American Veterinary Medical Association, Philadelphia, Pa., September 13-16, 1927.

cation than any that has existed hitherto. This society, through its Committee on Characterization and Classification of Bacterial Types, proposed a new classification in 1917. In 1920 a revision of this classification was made and the Committee was then dissolved and a new one known as the Committee on Taxonomy was formed. This committee accepted the invitation of Dr. D. H. Bergey, of the University of Pennsylvania, who had been preparing a comprehensive key of bacterial species, to collaborate with him in finishing the work. Bergey's *Manual of Determinative Bacteriology*, therefore, may be regarded as the work of a committee of the Society of American Bacteriologists.

Bergey's *Manual* serves a very useful purpose and has been widely sold, as is evidenced by the early appearance of a second edition. The volume is an ambitious attempt to collect descriptions of all bacteria which have been studied and arrange them in the form of a key, so that students are given a means of tracing and identifying species with which they are unfamiliar. Other keys to bacterial species have been published but all of these are now old, out-of-date and incomplete.

NEW NAMES INTRODUCED

Bergey's key is based upon the earlier classifications of the Committee on Characterization and Classification, but many new genera were created. Because of the creation of the new genera, a multitude of new names were necessarily introduced. These have invaded the ranks of our well-known pathogenic bacteria and we are now confronted in our journals with such unfamiliar names as *Escherichia coli*, *Pfeifferella mallei*, *Corynebacterium diphtheriae*, *Alkaligenes abortus*, and *Salmonella pullorum*, terms designating organisms better known to most of us under other names.

Just as Chester's *Manual of Determinative Bacteriology*, which was published over twenty-five years ago, was largely responsible for introducing the nomenclature of Migula into fairly general usage in this country, so has Bergey's *Manual* operated to establish the newer nomenclature.

Classifications in any field of biology are only matters of judgment. They represent attempts to arrange living things in such a way as to indicate their relationships to one another. Classifications, therefore, depend upon the facts which are known about the objects classified and the interpretation which is put upon these facts by the workers concerned. As additional facts are

learned or as the facts are differently interpreted in the light of new knowledge, classifications inevitably change and new ones arise. This process will go on as long as scientific research continues.

Since classification is wholly a matter of judgment, attempting to regulate it through legislation of organizations of any kind is intolerable and unscientific. As Bradley* has recently written, "It is the bounden duty of every man of science to make known the facts of science as he perceives them, and it is his inalienable right to interpret these facts according to his best judgment."

The classification of Bergey is not to be regarded as an attempt on the part of the Society of American Bacteriologists to force a new classification and a new nomenclature of bacteria upon American bacteriologists. It is not to be regarded as in any sense an official classification. It is merely an attempt by members of an organization of bacteriologists to produce a new classification which through its merits would appeal to the profession and would be adopted as superior to other classifications which exist.

NOMENCLATURE A MATTER OF LANGUAGE

Although it is not proper for organizations to attempt standardization of biological classifications, it is fitting and even necessary that organized efforts be made to standardize nomenclature. Nomenclature is merely a "matter of language." If there is no standardization of names, babel results. Stabilization has been accomplished, in so far as possible, by the zoologists and botanists through the creation of international codes of nomenclature and the formation of international commissions on nomenclature whose business it is to decide difficult questions on this phase of biology. Since the bacteria are generally considered to belong to the plant kingdom, bacteriological names are governed by the international botanical code.

Under the rules of the international codes, the law of priority governs the validity of names in all but special cases. That is to say, the name which can be shown to have been first applied to an organism remains the specific name always, unless this same name by chance has been used previously for some other organism. Names which are applied later by others, who may not have known that the species had already been named, or who did not consider the first name as appropriate for any reason, are not valid and are dropped as soon as the facts are known. This

**Science*, 1927, 66 (July 29), p. 100.

rule gives a strict guide by which it is usually possible to determine what the valid name of any species is, and all scientists abide by it. The fixity of this rule has stabilized the specific name of all living things rather thoroughly. There are occasions, however, when the name of the species must be changed. As an example I may mention the name of the organism of green pus. This organism is well known under the name of *Bacillus* or *Pseudomonas pyocyanus*. The specific name *pyocyanus* was first applied to this organism by the Frenchman, Gessard, in 1882. Recently it has been discovered that the same organism was described 10 years earlier by a German, Schröter, who gave it the name *aeruginosa*. The law of priority requires, therefore, that the name *pyocyanus* be dropped and *aeruginosa* substituted for it. Such changes fortunately are not frequent.

LAW OF PRIORITY GOVERNS

The change in nomenclature which occurs most frequently and which is, therefore, the most disconcerting, is that which occurs in the first, or generic, name of an organism. This name is the name of the genus or group and is common to all members of that group. This name is also subject to the action of the law of priority. When a group is once defined and a name applied to it, that name becomes the only valid one. As newer classifications are formed, however, organisms are grouped in new ways, and usually larger groups are broken up into smaller ones. The newly formed groups require names and names are applied to them. The organisms which are placed in the newly formed groups thus take the name of the new group as their own first name and drop the name of the group in which they formerly were. To illustrate the general action of the law of priority in nomenclature, we may take the case of the organism of infectious abortion of cattle, the Bang bacillus. This organism is variously named *Bacillus abortus*, *Bacterium abortus*, *Brucella abortus* and *Alkaligenes abortus*. The specific name *abortus*, it will be noticed, is constant. This is the only specific name which may properly be applied to this organism, since it is the name which was applied to it by Professor Bang, who first described it. Under the international code, any one of the generic names, *Bacillus*, *Bacterium*, *Brucella* or *Alkaligenes*, is proper. These names apply to different groups and every scientist is at liberty to classify species into whatever groups he pleases. Other names than the above may even be proposed and be valid as a generic name for this organism.

However, none of the names may represent a group which has already been defined and named.

Classification of objects so small as the bacteria presents inherent difficulty. Classification among botanists and zoologists, who generally deal with forms which are much larger and more complex, is based solely on morphology. Some of the earlier classifications of bacteria likewise were based upon morphology but since the structure of these forms, so far as our optical equipments permit us to judge, is very simple, the classifications were necessarily simple. Simplicity is a virtue but when it is based upon ignorance its virtue fails. All animals might be classified simply into the legged and the legless, but the value of such an arrangement may be doubted. Similarly the grouping of all the rod-shaped organisms into a single genus, *Bacillus*, for example, may be similarly criticized.

Confronted with the difficulty of defining and classifying bacteria upon a purely morphological basis, bacteriologists early began to make use of physiological characters. That is to say, when morphology failed them recourse was had to behavior, habitat and characteristics of metabolism. At first these criteria were used only for characterizing the species. Such use was made of physiological characters in the well-known classification of Migula. In later years many bacterial taxonomists have made use of characters other than morphological in describing genera, tribes and families. The classification of Bergey makes free use of such characters.

HABITAT NOT AN INTRINSIC FEATURE

There are many capable bacteriologists who deplore the building-up of classifications upon physiological features, minor morphological characters and habitat.* The two former are insecure, since they are frequently variable and the latter is an extrinsic feature rather than an intrinsic one. A knowledge of habitat is highly desirable, but it should not be used as the basis for classifications. Hall asks the question: "If I am found in Africa, does that classify me as a negro?" These persons believe that it would be better to preserve our older and admittedly inadequate classifications rather than to form new groups upon indefinite and insecure data, and thereby introduce new and probably transient names to confuse the literature. I do not believe that these persons can be accused of being old-fashioned

*See Hall, *Jour. Bact.*, 1927, 13, 245.

because of this stand. They are merely demanding that something better be brought forward before the old is released.

The difficulty of rational classification of bacteria has been increased during the last few years through the rapidly collecting knowledge regarding mutation in bacterial cultures. It has become apparent that many bacterial cultures change or produce strains or sports which are very different from the parent stock. To mention only a few, capsule-forming organisms may produce non-capsule-forming strains, virulent organisms may produce non-virulent fractions, spore-formers may throw off non-spore-forming strains, the same organism may form two or more different types of colonies on solid media, and sports may be produced which have serological characters utterly differing from those of the parent stock. Some apparently pure cultures are known in which the cells are typical coccus forms at one time and typical rods at another.

MUTATIONS MAY AFFECT MAJOR FEATURES

Changes such as those cited are not observed in the general run of our cultures. This may be a fault of our observations or it may be that only certain organisms are prone to mutate. It will be noted that many of the mutations are evidenced morphologically and some affect major features which have been used even in our older classifications as criteria for the formation of groups.

Intrinsically these mutants cannot be very different from the parent organisms and yet when the difference is gauged by the standards which we now have for judging microorganisms, the difference is frequently greater than that which exists between distinct species and even genera. This fact, it seems to me, clearly shows the futility of hoping to build up useful and permanent classifications on characters other than the most elementary. Our older and very simple classifications do not appear any too secure in the light of some of these modern observations.

The nomenclature introduced to American bacteriologists by the classification of Bergey has been a source of great perplexity to many of us. Some have accepted the classification in its entirety, others are willing to accept certain parts but not others, while still others have ignored it completely. The writer belongs to the group which is willing to accept certain parts but not all of it. The placing of the acid-fast organisms together in the genus *Mycobacterium*, the diphtheria and diphtheroids in the genus *Corynebacterium*, the spore-bearing anaerobes in the genus

Clostridium, the aerobic spore-bearers in the genus *Bacillus*, are examples of meritorious groupings. These groups all appear to be natural. The definitions of the groups are clear. They are all based upon morphology and tinctorial properties which are easily determined. All of these groups were adopted by Bergey from earlier classifications. On the other hand, the grouping of the Malta fever organism and the Bang abortion organism in the genus *Alkaligenes*, of which the type species is an intestinal organism, merely because these organisms lack, in common, the power to ferment carbohydrates, does not appear rational. Classifications are supposed to indicate relationships. The type species of the genus *Alkaligenes* is more closely related to the colon-typhoid group than to the Malta fever organism.

THE COLON-TYPHOID GROUP

Bergey has seen fit to break up the well-known colon-typhoid group into three new genera, *Escherichia*, *Salmonella* and *Eberthella*, corresponding to the long-recognized sub-groups. That a nucleus for each of these three groups exists cannot be denied. However, it is difficult or impossible to draw a sharp dividing line between them. The fowl typhoid organism, for example, is practically indistinguishable from the organism of bacillary white diarrhea of chicks, except for the fact that it does not form gas from carbohydrates. There is good reason to believe that one is merely a variant of the other. According to the newer classification, these two organisms must be placed in different genera. Apparently sensing the absurdity of separating these two organisms in different genera, Bergey has placed the fowl typhoid organism in the genus *Salmonella* with the bacillary white diarrhea organism, even though the characters of the organism definitely require that it be placed in the genus *Eberthella*. The absurdity of the situation is emphasized still more when it is recalled that some strains of the organism of bacillary white diarrhea are aerogenic at one time and not at another. When aerogenic the organism should be known as *Salmonella pullorum*; when non-aerogenic, *Eberthella pullorum*.

The classification of Bergey was prepared by a group of able scientists who gave a great deal of thought and time to the work. It stands to reason, therefore, that it should be worthy of careful consideration. That the work would have its faults was a foregone conclusion. That it would be unacceptable to many could also have been predicted. It is to be hoped that this early

classification will evolve into a form which may ultimately prove satisfactory to most bacteriologists. If persons use those portions which appeal to them as satisfactory and ignore those which are not, the sooner will it become evident where the faults of it lie. The work has not been used to any extent by European workers and some of our best bacteriologists have not seen fit to adopt it, hence one cannot be considered as archaic or ill-informed if he prefers to use the older terminology in place of the new.

This paper was prepared at the request of the editor of the JOURNAL of this Association. I presume he has been concerned over the lack of uniformity of the nomenclature of the bacteria mentioned in manuscripts coming to him for publication. Good editors always seek for uniformity of style and usage, but some things cannot be standardized. I do not think an editor should attempt to standardize the names of bacteria which are used by his authors; in fact, I do not think he has the right to insist that any particular system of nomenclature be used, so long as it conforms with the international botanical code. This means that the nomenclature of Bergey, or of Migula, or of any other of the sixty-some-odd who have labored with the subject, should be equally acceptable. Since we have long had the habit of referring to organisms casually by their specific names, and since these seldom change, the editor can be consoled with the thought that however grating to his delicate sensibilities the appearance of a variety of names for the same organism in his columns may be, there is little likelihood that actual confusion will result.

STAGING A COME-BACK

News that the horseshoe manufacturers are making more horseshoes than ever before, that the horseshoe nail makers are making more kegs of nails, and the calk makers more calks can mean only one thing—Dobbin is staging a come-back.

Just how to account for this is a bit difficult. As autos have increased by the hundreds of thousands, as fire departments have become motorized, as police have given up their steeds for motorcycles and as farms have become tractorized, it seemed that the day of the last horse on earth was not far off. That the horse is holding his own is good tidings indeed. A world without horses would be like a world without dogs—a sorry, lonely place indeed. Of all man's friends, the horse has been one of the best.—*Wilmington (Delaware) Journal*.

PRECIPITATION OF LETHAL PRINCIPLE OF TUBERCULIN BY AMMONIUM SULPHATE

By R. R. HENLEY, M. DORSET and H. E. MOSKEY
U. S. Bureau of Animal Industry, Washington, D. C.

INTRODUCTORY

In a recent number of this journal¹ the separation from tuberculin of two biologically active fractions was reported. These fractions were separated by dialysis in one series of experiments and by saturation with ammonium sulphate in another. It was found that the non-dialyzable portions of the experimental tuberculins in one case, and the portions precipitated by ammonium sulphate in the other, as had been previously shown by Seibert and Long² and others, contained practically all of the material capable of inducing a skin reaction in guinea pigs. In contrast to this the diffusible portions of the tuberculins and the ammonium sulphate-soluble portions, though practically devoid of skin-reacting power, yet contained a large part of the material which exists in all tuberculin, and which is capable of bringing about the death of sensitive, tuberculous guinea pigs. In the paper above referred to, it was noted that the non-dialyzable portions as well as the portions precipitated by ammonium sulphate, always contained a certain amount of lethal material, along with the skin-reacting material. In other words, the skin-reacting material passed not at all through the dialyzers and was completely precipitated by ammonium sulphate, but the lethal material appeared to be divided between the two fractions in both series of experiments. This division was not uniform in the different tuberculins. In some, the lethal material appeared more diffusible and more soluble than in others. This led to the conjecture that the lethal material, while largely soluble in saturated ammonium sulphate in the case of tuberculin prepared from one set of cultures, might be almost entirely insoluble in the case of tuberculin prepared from another set of cultures, the differences in the two cases being due to changes resulting from the metabolic processes of the tubercle bacilli. In the experiments previously reported, most of the cultures used for production of tuberculin were propagated on a synthetic medium and were all of considerable age. The reaction of the sterilized

*Received for publication, October 6, 1927.

cultures was always acid, as is to be expected in old growths of *B. tuberculosis*, human type.

EXPERIMENTAL

For the purposes of the present study sixteen tuberculins were prepared from cultures of *B. tuberculosis*, human type. All cultures were grown on a synthetic medium which has been described elsewhere.³ Each tuberculin was made from a separate lot of culture medium. The ages of the cultures at the time of preparing the tuberculins varied from 5 to 33 weeks, and the reaction varied from pH 5.2, in the case of the older cultures, to pH 9 in the younger ones. Each of these tuberculins was separated into two fractions, a precipitate and a filtrate, by saturation with ammonium sulphate. The ammonium sulphate was removed from the soluble portions essentially as described in the previous communication,¹ except that only two volumes of alcohol were used instead of three volumes, since later work had shown that the amount of ammonium sulphate in our filtrate, after treatment with 66 per cent alcohol, was negligible.

The following protocol of the preparation of the two fractions from tuberculin 2 will make clear the method of procedure which was followed in all cases for each 2400 cc of culture fluid.

Tuberculin 2: After sterilization and evaporation of the filtered culture fluid to a volume of 480 cc, pure neutral crystals of ammonium sulphate were added with frequent stirring until complete saturation was obtained. The saturated solution was allowed to stand over night. The precipitate was removed by filtration through hardened paper, dissolved in 130 cc of water and again saturated with ammonium sulphate. This second precipitate was separated by centrifugation, taken up in water and made to a volume of 1920 cc. The first filtrate from the ammonium sulphate precipitate, amounting to 550 cc, was mixed and thoroughly shaken with 1100 cc of absolute alcohol and allowed to stand over night. The alcoholic precipitate, consisting mostly of ammonium sulphate, was removed with the centrifuge. The clear alcoholic solution thus obtained was evaporated to a low volume to remove the alcohol and was then made to a volume of 960 cc for test.

The tests of the lethal power of the soluble and insoluble fractions were always made simultaneously on the same lot of tuberculous guinea pigs. The comparative skin tests of filtrate and precipitate were made on the same guinea pigs. For example, in testing tuberculin 2, three tests were made of both filtrate and precipitate, using three sensitive guinea pigs, each animal being injected simultaneously with filtrate on one side of the shaved abdomen and with precipitate on the other. The results of the tests made with each tuberculin, together with the age and reaction of the sterilized cultures, are recorded in the accompanying table.

DISCUSSION

The accompanying table clearly shows that solubility of the lethal material is associated with both the age and reaction of the cultures. The comparatively young, alkaline cultures yielded

tuberculin from which the lethal principle was completely precipitated by saturation with ammonium sulphate, whereas the old, acid cultures invariably yielded lethal material which was not precipitated under similar conditions. It seems that the acid reaction is necessary for the development of the soluble lethal material and that time probably is important in determining the amount present in the culture fluid.

More or less profound changes in the chemical composition of the soluble products derived from human-type tubercle bacilli.

TABLE I—*Tests on tuberculous guinea pigs of ammonium sulphate fractions from different tuberculins*

TUBERCULIN	SKIN REACTIONS ¹						LETHAL POWER ¹						
	TESTS OF FILTRATES			TESTS OF PRECIPITATES			TESTS OF FILTRATES		TESTS OF PRECIPITATES				
	No.	pH	AGE (WEEKS)	I	II	III	I	II	III	G. PIGS INJECTED ²	G. PIGS DIED	G. PIGS INJECTED ²	G. PIGS DIED
1	5.2	30	— — —	3 +	3 +	2 +	3	3	3	3	0	—	—
2	5.2	24	?	—	4 +	4 +	3	3	3	3	0	—	—
3	5.2	20	— — —	4 +	4 +	2 +	3	3	3	3	1	—	—
4	5.2	33	— — —	3 +	1 +	—	3	3	3	3	2*	—	—
5	5.2	21	?	?	—	2 +	2 +	4 +	3	2	3	0	—
6	5.2	29	— — —	—	3 +	1 +	3	2	3	3	1	—	—
7	5.2	33	— — —	—	2 +	3 +	3	2	3	3	3	—	—
8	5.2	25	— — —	—	3 +	1 +	4 +	3	2	3	0	—	—
9	5.2	24	— — —	—	—	1 +	2 +	1 +	3	2	3	1	—
10	5.2	14	— — —	—	—	3 +	3 +	4 +	3	1	3	2	—
11	6.3	17	— — —	—	—	3 +	4 +	4 +	3	1	3	1	—
12	6.5	6	— — —	—	—	3 +	2 +	—	3	0 ³	3	3	—
13	7.8	13	— — —	—	—	5 +	5 +	4 +	3	0	3	1	—
14	8.2	18	— — —	—	—	3 +	4 +	4 +	3	0	3	3	—
15	8.2	6	— — —	—	—	—	4 +	3 +	—	3	0	3	3
16	9.0	5	— — —	—	—	3 +	4 +	4 +	3	0	3	3	3

*Doses: skin tests, 0.1 cc intradermally; tests of lethal power 2 cc per 500-gram guinea pig, intraperitoneally.

²In addition, one or more normal animals were injected with 3 cc of each fraction, and all remained normal.

³Filtrates from tuberculins 12-16, inclusive, produced no reaction in any animal.

accompany and follow the change in the reaction of the cultures. There is an increase in soluble carbohydrates, a decrease in the acetic acid precipitable material and a noticeable change in the character and the amount of ammonium sulphate precipitate. The change in the behavior of the lethal material may be due to a splitting-up of a more complex molecule, perhaps that which causes the skin reactions, or the soluble lethal material may be distinct from that which is insoluble and may be derived

from the bacillary bodies in the presence of acid. These and other interesting problems are being further investigated.

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³Dorset, M., Henley, R. R., & Moskey, H. E.: Effect of adsorbents upon potency of tuberculin. *Jour. A. V. M. A.*, lxx (1926), n. s. 23 (3), pp. 373-377.
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PROFESSOR BANG THE GUEST OF CORNELL

Professor Bernhard C. F. Bang, of Copenhagen, Denmark, was the guest of Cornell University, October 11-13, 1927. He spoke on Johne's disease to a large and appreciative group of veterinarians and scientific workers, Tuesday afternoon, October 11. In the evening a dinner was given by the University in his honor. It was held in the Red Room of Prudence Risley Hall. Invitations had been extended to the members of the faculty of the Veterinary College, the local veterinarians, the veterinarians in the Department of Farms and Markets, at Albany, and to the members of the staff of the Department of Animal Husbandry at Cornell.

Dean Moore presided at the dinner, for which fifty-five covers were laid. Dr. Livingston Farrand, president of Cornell University, extended the welcome to Cornell to Prof. Bang and expressed a very happy appreciation of him and the scientific work which he had accomplished. Prof. Bang gave a short address, expressing his thanks for the welcome and his pleasure at being able to visit Cornell.

Those who did honor to Prof. Bang were representative of the live stock interests of the whole state. Veterinarians from all sections of the state were present, as were breeders of live stock and those engaged in the teaching of animal husbandry.

Prof. Bang gave a lecture on the control of infectious abortion at noon, Wednesday, October 12. The rest of this time was taken up with visits to the laboratories and clinics connected with the Veterinary College.

USE OF WHOLE MILK INCREASED

The quantity of whole milk produced in the United States last year increased four billion pounds over 1925, the Department of Agriculture discloses. Most of the increase was consumed as fluid milk in households, or in the manufacture of butter and ice cream.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

DERMOID CYST IN TESTICLE OF A MONORCHID COLT

By W. WISNICKY and B. A. BEACH

*Department of Veterinary Science, University of Wisconsin
Madison, Wis.*

Subject: Badger Muratan, a pure-bred Clydesdale colt, owned by the University of Wisconsin. When the colt was about one year of age it was observed that the left testicle failed to make its descent into the scrotal sac. Another year was allowed to pass and still the condition remained unchanged, so it was decided to perform a cryptorchidectomy.

On February 11, 1927, preparations were made to perform the operation. It was decided that the operation would be performed without general anesthesia, figuring that the chances were largely in favor of the undescended testicle being lodged in the inguinal canal and that the operation could be completed before the subject could be placed under the anesthetic. The instruments were sterilized by boiling, a large, sterile, gauze pack was made, and two vessels of antiseptic solution were prepared.

The colt was led into the University stock pavilion, which had a covering of tan bark. The animal was cast and placed in dorso-lateral recumbency, the hocks were well flexed and secured, and the left thigh, which was the operative side, was abducted as fully as possible in order to facilitate the dilation of the left inguinal canal. The parts of the body above the operative area were dampened and the hands of the operators and the operative area were rendered as aseptic as possible.

Operation: By palpation the left external inguinal ring was determined and an incision was made through the skin directly over it and in the general direction and extent of the ring. After separating the loose areolar tissue, the hand of the operator, in the form of a cone, was introduced into the inguinal canal. Nothing could be felt for a time and after careful exploration

with the tips of the index and second fingers a structure was located at the internal inguinal ring. Forceps were attached to this structure and further exploration continued. The vaginal membrane was punctured with the index finger and the structure to which the forceps were clamped was drawn outward. This structure was a loop of the spermatic cord, but it caused considerable confusion on account of its abnormal size and length. When tensed it extended about ten inches outside of the external ring. With spermatic cord tense, the hand was passed along its parts to the internal inguinal ring, yet by pulling separately upon each part, it was impossible to draw out the testicle.

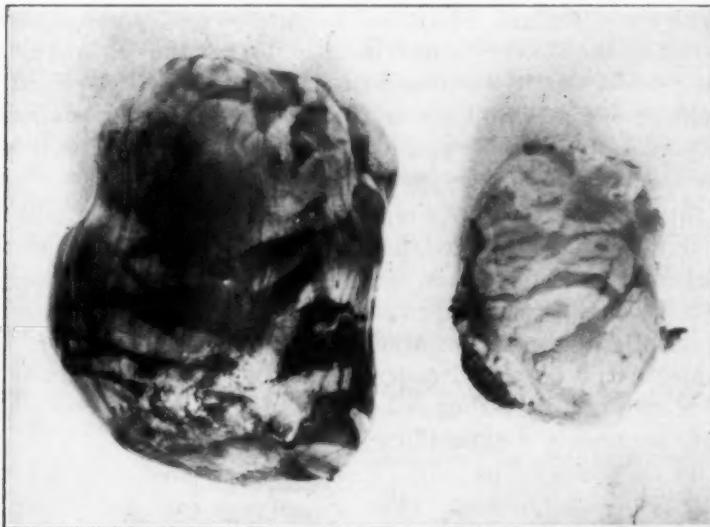


FIGURE 1. Diseased testicle at left; normal, at right. Note difference in size and shape.

The manipulations caused the patient to strain and contract the muscles to the extent that the operator's hand became paralyzed in a short time and the authors were compelled to continue the operation in relays. A large structure could be felt at the end of the cord. However, after a moderate dilation of the internal inguinal ring and tension on the cord no progress could be made. Then the internal inguinal ring was extensively dilated, the hand introduced into the peritoneal cavity and the fingers placed back of the large structure. Between the struggling spasms of the animal the greatly enlarged testicle was removed by means of tension on the cord and lifting with the hand in the

peritoneal cavity. The enlarged testicular mass was emasculated with about two feet of spermatic cord. A tampon made of disinfected gauze was pushed in the inguinal canal. The tampon was anchored by suturing it to the skin. The other testicle was removed in the regular manner, the patient released and permitted to get up, after being rolled on the left side, so that the rising effort would not dilate the left internal inguinal ring.

Anticipating a probable peritonitis, three-ounce doses of quinin sulphate daily were prescribed. The first day after the operation the temperature of the patient was 102.5° F. The second day it rose to 102.8° and the third day it dropped to 102°



FIGURE 2. Diseased testicle incised, showing contents.

at which time the danger period was considered passed. The tampon was removed after twenty-four hours. The extensive swelling in the inguinal region entirely closed the canal. The patient appeared stiff in the hind quarters and had no desire to lie down. His appetite was indifferent at first, but improved later. The quinin sulphate was discontinued after the third day. No further treatment was given and the animal made a rapid recovery.

Figure 1 shows (at the left) the abnormal testicle which weighed 515 grams; the normal one (on the right of the figure) weighed 120 grams. The large testicle measured 14 inches around the

largest circumference and $10\frac{1}{2}$ inches around the smallest circumference; the depth was $2\frac{1}{8}$ inches.

Upon opening the diseased testicle it was found to have a dermoid cyst containing cystic fluid, cartilage, teeth and hair, as shown in the second figure.

DIAPHRAGMATIC HERNIA AND INCARCERATION

By L. E. STANTON, Burt, Iowa

A four-year-old grade gelding, with history of working in the forenoon of October 1, 1927. Bowel movements noticed to be rather soft. Ate feed at noon and soon afterward was noticed sick with colic. I saw the animal after he had been sick about two hours. Temperature, normal; pulse, weak and fast; respirations, fast and labored; peristalsis, active. Suspected gastric dilatation but passage of the stomach-tube did not reveal any distension. There was no let-up in the colic at all and the animal seemed to be growing steadily worse.

One ounce of creolin in solution was pumped into the stomach; also two ounces of chloral hydrate in one gallon of warm water, and the animal was observed for a half-hour. This did not relieve the animal any and during this time the animal had no passage of gas or feces. A diagnosis of displacement of the bowel was made and an unfavorable prognosis given. The animal died twelve hours later.

Autopsy revealed a rupture in the diaphragm, about one inch in diameter and perfectly round. It was to the left of the median plane, in the tendinous part, just below the left lateral ligament of the liver. This ring had evidently been present for some time, as the edges were rounded and there was an adhesion of the omentum on the right side of the ring, about six or eight inches being prolapsed into the thoracic cavity.

A large mass of the small intestine was incarcerated through the ring into the thoracic cavity. This bowel was black and hemorrhagic, as incarcerated bowel becomes. The ileo-cecal opening was about six feet from the ring, which shows the part of the bowel that was incarcerated. The bowel was removed from the thoracic cavity and the mesentery cut off. I stretched the bowel out and it measured forty feet.

This is the first case of this kind that I have ever seen and it seemed rather unusual to me.

REVIEW

ZUR PATHOLOGIE UND THERAPIE DER STERILITAT DER WEIBLICHEN HAUSTIERE MIT BESONDERER BERÜCKSICHTIGUNG DER PHYSIOLOGIE (The Pathology and Therapeutics of Sterility in Female Domestic Animals with Special Reference to Physiology). Professor Dr. Walter Frei, Director, Veterinary Pathological Institute, University of Zurich. vi + 196 pages, with 20 text figures. R. Schoetz, Berlin, 1927.

This book is the only publication in existence which treats extensively of sterility in domestic animals from the physiological standpoint, although there are a number of books dealing with the subject from a clinical and pathological-anatomical standpoint. The results of physiological research throughout the world, in the fields of endocrinology and metabolism as related to reproduction, are reviewed, and much original material is introduced from the discoveries of the author himself and his associates.

An outstanding feature is the graphic presentation of the interrelation of the reproductive organs and the endocrine glands. The book also contains some ingenious diagrams which explain at a glance the important features of the estrous cycle in the cow. They show how the periodic changes of the ovary in the cow synchronize with the periodic changes in the uterus and vagina. Similar diagrams show the common pathologic variations in the cow's estrous cycle, *i. e.*, inactivity of the ovary, ovulation without signs of estrus, estrus without ovulation, nymphomania, hyposecretion of the antifollicle hormone and corpus luteum persists.

The chapter on therapy will interest every veterinary practitioner, although it deals largely with hypothetical explanations of the known or alleged effects of various therapeutic procedures, such as ovarian massage, gonad transplantation, and uterine lavage. It would seem that the writer has purposely refrained from any description of technic, and no specific directions are given for carrying out his general recommendations for proper feeding, housing and management.

Many problems yet to be solved are emphasized and the work is replete in suggestions for further research.

C. M. H.

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ARMY VETERINARY SERVICE

CHANGES RELATIVE TO VETERINARY OFFICERS

Lt. Colonel Jules H. Uri, Fort Riley, Kans., was promoted to the grade of colonel with rank from October 9, 1927.

The appointment of Second Lieutenant Charles S. Greer, Veterinary Corps Reserve, as second lieutenant, Veterinary Corps, Regular Army, with rank from Oct. 7, 1927, is announced. Lieutenant Greer will proceed from Clear Lake, Iowa, to Washington, D. C., and report to the Commandant, Army Medical School, Army Medical Center, for duty.

Lt. Colonel Aquila Mitchell died October 16, 1927, at Fort Oglethorpe, Ga.

Regular Army

New Acceptances

Cotton, Harry Lynn.....	Captain.. 18479 Trinity Ave., Redford, Detroit, Mich.
Clayton, Charles E.....	Captain.. 150 W. 106th St., New York, N. Y.
Prouse, Wm. Caleb.....	Captain.. 105 E. 16th St., Minneapolis, Minn.
Skidmore, L. V.....	1st Lt... 3859 Dudley St., Lincoln, Nebr.
Loder, G. Donald.....	2nd Lt... Box 338, Sacramento, Calif.

Reserve Corps

Separations

Hagan, Wm. Arthur.....	Captain.. Failed to accept reappointment.
Greer, Charles S.....	2nd Lt... Accepted appointment in Regular Army.

Promotions

Kitselman, Chas. H.....	Captain.. Manhattan, Kansas.
Paquin, Leon A.....	Captain.. 5 Negus St., Webster, Mass.

VISITORS AT THE JOURNAL OFFICE

More than the usual number of veterinarians have paid their respects at the JOURNAL office during recent months. Among the out-of-town veterinarians who have been in Detroit and have found time to stop at the office are the following: Dr. J. H. McLeod, Tipton, Iowa; Dr. A. F. Baldwin, Miles City, Mont.; Dr. Reuben Hilty, Toledo, Ohio; Dr. F. A. Lambert, Columbus, Ohio; Dr. George D. Gibson, Adrian, Mich.; Dr. L. A. Wileden, Mason, Mich.; Dr. B. J. Killham, Lansing, Mich.; Drs. Ward Giltner, E. K. Sales and H. J. Stafseth, of East Lansing, Mich.; Dr. E. B. Cavell, Northville, Mich.; Dr. W. J. Embree, Chicago, Ill.

The following Detroit veterinarians have dropped in at the office recently, in many cases for the purpose of paying their 1928 dues: Drs. John Hoberg, E. P. Schaffter, Joseph Hawkins, E. G. Folsom, J. S. Glover, A. S. Schlingman, H. H. Sparhawk, E. E. Patterson and C. W. Eddy.

AMERICAN VETERINARY MEDICAL ASSOCIATION
Proceedings of Sixty-fourth Annual Meeting, Philadelphia,
Pennsylvania, September 13 to 16, 1927.

SECTION ON GENERAL PRACTICE

WEDNESDAY MORNING, September 14, 1927

The first session of the Section on General Practice was called to order at 9:30 o'clock by Dr. J. N. Frost, chairman.

CHAIRMAN FROST: The first in order is the Chairman's address. This morning the Chairman is not going to take up your time with any set address. You all know your own problems, and in arranging the program we have tried to arrange one which would hit a few of these problems, and I do not think it is worth while for you to listen to an address by the Chairman. You have your problems, and we have tried to arrange a program which, with your discussion, will help to clear up some of these as far as possible. With that idea in view and the fact that we have one extra paper this morning that is not on the program, I am not going to take up any time with an address.

The program has been arranged largely by Dr. Althouse. I imagine he has had some difficulty in doing this. I know last year in arranging a program it took considerable work to get replies from men who were willing to give a paper or even a discussion, and I presume that it has not been very much different this year.

The next is the Secretary's report, Dr. E. P. Althouse.

DR. ALTHOUSE: I haven't much to say, Mr. Chairman. We have written about one hundred letters to different men and we wrote as many as two and three letters before we got a reply from some of them, so you can see what it means to try to arrange a program for a section. However, we have endeavored to give you the best that we could get and I trust it will meet with the approval of most of you.

The following program was then presented:

"Some Observations on the Use of Streptococcus Bacterin in the Prevention and Treatment of Mastitis of Cows," Dr. John P. Turner.

"Specific Infectious Cystitis and Pyelonephritis of Cows," Drs. F. S. Jones and Ralph B. Little. (Read by Dr. Jones.) (Illustrated with lantern-slides.)

"Some Causes of Sterility in Cattle," Dr. Leonard W. Goss.
(Illustrated with lantern-slides.)

"Hog Cholera in the Young Pig," Dr. J. W. Benner.
The session adjourned at 12:45 p. m.

ADJOURNMENT.

THURSDAY MORNING, September 15, 1927

The second session was called to order at 9:30 o'clock by Chairman Frost.

The following program was presented:

"Some Problems for the Practitioner in Commercial Dairy Herds," Dr. Edward R. Cushing.

"The Physiology of Milk Fever," Dr. P. A. Fish.

"The Clinical Diagnosis of Genital Disease of the Cow," Dr. W. W. Williams. (Illustrated with lantern-slides.)

"Points of Interest in Clinical Veterinary Medicine," Dr. L. A. Merillat.

* * *

CHAIRMAN FROST: We will proceed to the election of section officers. The first to be elected is the Chairman. Nominations for chairman of the Section are now in order.

DR JOHN P. TURNER: I nominate the present Chairman and Secretary.

The nomination was seconded by Dr. T. H. Ferguson.

CHAIRMAN FROST: The nomination of the present officers as chairman and secretary has been made and seconded. If there is no opposition and no objection, they will stand elected without any further ceremony.

The session adjourned at 1:00 p. m.

ADJOURNMENT.

SECTION ON EDUCATION AND RESEARCH

WEDNESDAY MORNING, September 14, 1927

The first session of the Section on Education and Research was called to order at 9:30 a. m., by Dr. E. M. Pickens, chairman.

CHAIRMAN PICKENS: We have entirely too many papers to get through with, so I am omitting the report of the chairman of the Section. Dr. R. A. Runnells, the Secretary, will be unable to be here and has not forwarded any report, so we will omit the

Secretary's report also. Dr. M. F. Barnes will act as secretary of the section.

I wonder if any of you have anything that should come before the Section before we start the program. I might say that I would like to express my thanks and Dr. Runnels' thanks to the people who are contributing papers to this program.

The following program was presented.

"Education for the Practice of Veterinary Medicine," Dr. D. H. Udall.

"The Clinic as the Foundation for Veterinary Education," Dr. W. L. Williams.

"Observations on Veterinary Education in Europe," Dr. H. C. Crawford.

The meeting adjourned at 12:30 p. m.

ADJOURNMENT.

THURSDAY MORNING, September 15, 1927.

The second session was called to order at 9:30 a. m., by Chairman Pickens.

The following program was presented.

"Enteritis in Swine," Dr. H. E. Biester.

"Review of the Work of the American Foot-and-Mouth Disease Commission," Dr. H. W. Schoening.

"The Teaching of Veterinary Science in Colleges of Agriculture," Dr. J. W. Connaway.

"Nomenclature of Pathogenic Bacteria," Dr. W. A. Hagan. (Read by title.)

"Neuritis or Paralysis in Chickens," L. P. Doyle. (Read by title.)

"The Bacillus of Swine Erysipelas. The Etiology of Erysipeloid of Fishermen," Dr. Malcolm J. Harkins.

"*Bacterium Viscosum Equi*: A Factor in Joint Ill and Septicemia in Young Foals," Drs. W. W. Dimock, Philip R. Edwards and J. F. Bullard. (Read by Dr. Dimock.)

"Manson's Eye Worm in Poultry," Dr. D. A. Sanders.

"A Normal Sheep Urinalysis," Drs. D. J. Healy and J. F. Bullard and Prof. H. F. Spears. (Read by Dr. Bullard.)

* * *

CHAIRMAN PICKENS: The Chair will now entertain a motion for election of a chairman for this section.

On motion duly made and seconded, Dr. R. A. Runnels was nominated as chairman. There being no further nominations,

Dr. Runnels was declared elected chairman of the Section for the ensuing year.

CHAIRMAN PICKENS: The next office is that of secretary. We will be glad to receive nominations for that office at this time.

On motion duly made and seconded, Dr. Malcolm J. Harkins was nominated as secretary. There being no further nominations, Dr. Harkins was declared secretary of the Section for the ensuing year.

The meeting adjourned at 12:30 p. m.

ADJOURNMENT

SECTION ON SANITARY SCIENCE AND FOOD HYGIENE

WEDNESDAY MORNING, September 14, 1927.

The first session of the Section on Sanitary Science and Food Hygiene was called to order at 9:30 a. m., by Dr. R. V. Rafnel, chairman *pro tempore*.

CHAIRMAN RAFNEL: I am sure that we all regret that Dr. Cahill is unable to be present this morning. In his absence, the President has asked me to act as chairman of the Section. Inasmuch as I was just appointed to fill this vacancy, I have no address to make this morning, so we will proceed with the regular program.

The first order of business is the Secretary's report, by Dr. N. F. Williams.

SECRETARY WILLIAMS: Unfortunately, the program calls for a Secretary's report, but the report is always embodied in the notes of the official stenographer and published in the JOURNAL, so, for that reason, we will not offer any report at this time.

CHAIRMAN RAFNEL: The first paper on our program this morning is, "What Is Dairy Farm Inspection?" by Dr. L. A. Klein.

Dr. Klein presented his paper.

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CHAIRMAN RAFNEL: If there is no further discussion, we have a resolution to present at this time.

Dr. W. G. Hollingworth presented the resolution. (See resolution 4, report of the Committee on Resolutions, general sessions).

SECRETARY WILLIAMS: All resolutions must go through the Committee on Resolutions. The only action that we can take here is for this meeting to recommend the offering of this resolu-

tion to the general body, through the regular channel—the Committee on Resolutions.

CHAIRMAN RAFNEL: Dr. Hollingworth, will you amend your motion to refer this resolution to the Committee on Resolutions?

Dr. Hollingworth amended his motion; seconded and carried.

CHAIRMAN RAFNEL: The next number on our program this morning is: "Problems of Public Health Work in Which Veterinarians Should Interest Themselves," by Dr. W. G. Hollingworth.

Dr. Hollingworth presented his paper.

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CHAIRMAN RAFNEL: If there is no further discussion, we will proceed to the next number on our program, which is a very important one, from a sanitary official's standpoint, especially in Mississippi, where we have been having more or less widespread outbreaks of rabies, that are not only attacking dogs, but also attacking our live stock. The next subject is: "The Control of Rabies by Prophylactic Vaccination," by Dr. Adolph Eichhorn.

Dr. Eichhorn presented his paper.

The meeting adjourned at 12:30 p. m.

ADJOURNMENT.

THURSDAY MORNING, September 15, 1927.

The second session was called to order at 9:30 a. m. by Dr. R. V. Rafnel, chairman *pro tempore*.

CHAIRMAN RAFNEL: For our first subject this morning, we have one that is very interesting to a great many of us who have come in contact with this disease and who are realizing that it is a disease that is going to demand considerable attention in the immediate future: "Johnin as a Diagnostic Agent in Paratuberculosis," by Dr. H. K. Wright.

Dr. Wright presented his paper.

CHAIRMAN RAFNEL: We have decided to continue the papers on Johne's disease until we have completed this subject and then open it up for general discussion. The next paper will be: "The Results Obtained by the Use of Johnin in Cattle," by Dr. H. W. Turner.

Dr. Turner presented his paper.

CHAIRMAN RAFNEL: Dr. W. W. Williams will give us a short paper, entitled: "A Possible Cure for Johne's Disease."

Dr. Williams presented his paper.

CHAIRMAN RAFNEL: This is a very interesting subject and I am sure we could go on indefinitely, but in justice to the remainder of our program I think we had better proceed with our next subject, which is a very important one, "Hog Cholera Control and the Veterinarian," by Dr. Marion Dorset.

Dr. Dorset presented his paper.

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CHAIRMAN RAFNEL: We still have some time. I might say that Dr. Craig, who has the next paper, is unable to be here and we will simply read his paper by title: "Sanitary Measures for the Control of Bacillary White Diarrhea."

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CHAIRMAN RAFNEL: If there are no other questions, we will proceed to the election of section officers. As I understand, any member of the Association is eligible to the chairmanship of the Section and nominations will now be in order for chairman.

DR. WILLIAM MOORE: I move that the present officers be continued for the coming year.

The motion was seconded.

SECRETARY WILLIAMS: This was my second term. Dr. Cahill also was serving his second term and I think this honor and the work attached should be passed on.

CHAIRMAN RAFNEL: It has been moved and seconded that the present officers, Dr. Cahill and Dr. Williams, be continued in office. Are there any other nominations?

DR. J. S. KOEN: I misunderstood Dr. Moore's motion. I thought he intended that the two gentlemen who are presiding today would be continued in office. And, if I am in order, at this moment, I should like to place in nomination for chairman for the ensuing year the man who has occupied the chair today, Dr. Rafnel.

Nomination was seconded by Dr. Williams.

SECRETARY WILLIAMS: Gentlemen, this is a serious proposition for the best interests of the entire organization and of this organization that you change your officers at this time. There is nothing that will kill an organization or a section of an organization like perpetuation of the same officers. We appreciate, Dr. Cahill does, and I am sure I do, the honor you pay us, but I believe it is for your interest and the interest of this Association to inject some new blood into it and I am pleased to second Dr. Rafnel's nomination and, if the officers will be voted on separately, I will ask all those in favor of Dr. Rafnel to manifest their assent.

by saying "Aye." Are there any opposed? (None)—Dr. Rafnel is duly elected.

DR. H. E. ASH: I do not want to cause a fuss or anything, but, gentlemen, I am also sincere. I believe that, if anything is going to kill a section, it is putting a couple of fellows in office, as Dr. Williams says, and letting them go on year after year. So, if I am in order, I want to place in nomination the name of a man who has been a regular attendant of this organization and who has traveled as far, if not farther than any other man to attend the convention this year, I want to place in nomination for the office of Secretary the name of Dr. W. H. Lytle, of Oregon.

SECRETARY WILLIAMS: I will appreciate it very much if the gentleman who nominated me will withdraw that nomination.

Dr. Williams' name was not withdrawn, but on a rising vote, Dr. Lytle was elected by a vote of 9 to 7.

The meeting adjourned at 12:30 p. m.

ADJOURNMENT.

SECTION OF SMALL ANIMAL PRACTICE

WEDNESDAY MORNING, September 14, 1927

The first session of the Section on Small Animal Practice was called to order at 9:00 a. m., by Dr. J. V. Lacroix, chairman *pro tempore*.

DR. J. V. LACROIX: The hour of 9 o'clock, the time fixed for this gathering, having arrived, the meeting will come to order. Unfortunately, our Chairman, Dr. F. R. Whipple, is ill at the Mayo Clinic Hospital, Rochester, Minn., and the President of the Association has requested me to act in his stead. However, this body is a section in itself, a body which governs itself, and I think it entirely appropriate that the Chair entertain a motion for a permanent substitute chairman for this session.

DR. J. ELLIOTT CRAWFORD: I nominate Dr. J. V. Lacroix for chairman.

DR. J. C. FLYNN: I second the motion.

CHAIRMAN LACROIX: Are there any other nominations? I don't want the job.

DR. HAMLET MOORE: I move the nominations close, and that the Secretary be instructed to cast the unanimous vote of this body for Dr. Lacroix as chairman of this section.

DR. HARRY C. MILLAR: I second the motion.

The motion was thereupon agreed to, and Dr. J. V. Lacroix was declared the unanimous choice for chairman of the section.

CHAIRMAN LACROIX: I believe the first thing is a resolution, to be presented here for adoption.

DR. FLYNN: We are very unfortunate in the fact that the duly-elected chairman of this section is sick and unable to be present at this meeting and, with your permission, I will read a letter I received from him Monday morning, when I arrived in Philadelphia. He says:

It will be impossible for me to be with you at the meeting. In company with my physician, I arrived here at Rochester, Minnesota, on Tuesday, and, possibly, while you are enjoying all the good things in Philadelphia I will be either on the operating or dissecting-table. I have no idea how long I will be here, but drop me a line in care of the Mayo Clinic and tell me what was doing in the Small Animal Section, who was elected, et cetera. I wish you would extend, for me, to the Small Animal Section, my thanks for electing me their Chairman and express my sorrow that it is impossible for me to complete the duties of my office by attending the Philadelphia session. Certainly, my thoughts next week will be with the Small Animal Section.

Always with best wishes to you and yours, and trusting we may meet again within the very near future, I am

Yours,
(Signed) FRED R. WHIPPLE.

DR. FLYNN (continuing): I just jotted down a little resolution. It is hardly complete, as I have not had time to put it in the shape I would like to have it, but I will read it and it can be put in proper form for publication. It is as follows:

Dr. Frederick R. Whipple,
Care of Mayo Clinic,
Rochester, Minn.

The members of the Section on Small Animal Practice of the A. V. M. A., in business session assembled, hasten to express to you their sincere sympathy and regret that illness has prevented you from attending this session. We sincerely hope that ere this session has completed its labors we will receive a message advising us of your complete recovery.

DR. CRAWFORD: Mr. Chairman, I move the adoption of this resolution and recommend that the Section request the Secretary of the Association to send this message to Dr. Whipple.

DR. FLYNN: I second the motion.

CHAIRMAN LACROIX: The motion having been agreed to, the Secretary of the Association will be notified to send the message as presented by Dr. Flynn.

DR. H. J. MILKS: I am extremely sorry that Dr. Whipple could not be here today, because I know he has been vitally interested in this section for the past year, and I know the work that he has performed. I have his address here. It is very brief, as follows:

GENTLEMEN:

We meet this morning in a distinguished city, the birthplace of our nation and almost within sight of the building where it was declared that these colonies are, and by right ought to be, free and independent. I have more than a patriotic interest in the Declaration of Independence because, when a distant relative, William Whipple, signed that historic document, he left me no choice than that of eulogizing him when fate brings me to Philadelphia.

Moreover, we are meeting in a city that has contributed a great deal toward the advancement of veterinary medicine in this country. Already in the 50's the ambition to train men for the scientific treatment of animals existed here and that ambition culminated in the development of the Veterinary Department of the University of Pennsylvania, which has always been a school to which all American veterinarians have justly pointed to with pride. Philadelphia is also the home of one of our outstanding colleagues, Dr. Alexander Glass, whose name is a household word among small-animal practitioners and his work a monument to them. I know we all consider it a great favor to have Dr. Glass with us this morning.

This section was organized two years ago, largely through the instrumentality of my predecessor, Dr. J. C. Flynn, of Kansas City, and a former president, Dr. L. A. Merillat, who prevailed upon the Executive Board to yield to the wishes of the small-animal practitioners. It was during the term of ex-President Merillat that this section was organized. It was, therefore, at Portland Oregon, where the section was born, in 1925, with Dr. E. A. Ehmer, of Seattle, as chairman and Dr. J. C. Flynn, of Kansas City, as secretary.

As a section of this association has no separate by-laws and no separate code, it has only precedent as a guide to its policies, its work and its conduct. With this in mind, I feel free to say that it is not the purpose of this section to create exclusive small-animal practitioners but to enlarge the knowledge on small-animal problems for the benefit of veterinary medicine in general and particularly for the general practitioner. Those of us who devote all of our time to small animals will profit by the work of this section but the knowledge of small-animal medicine which will be brought together each succeeding year will be of still greater value to those who must devote themselves to all of the different species of domestic live stock. We are here to help the veterinarian, not alone the so-called small-animal specialist, and as long as we cultivate that feeling our relations with the association that created us will never be in jeopardy, for there is but one veterinary profession, notwithstanding that some specialize in particular branches.

Speaking as one of these specialists, who came out of general practice, I am free to say that the small-animal practitioner has done his share toward elevating standards, and this is all the more complimentary because, until two years ago, that progress was made independent of association work. It is pleasant to iterate and reiterate that the progress the small-animal practitioner has made in diagnosis, in therapeutics, in surgery and in the art of hospitalization has had a wholesome effect upon the status enjoyed by members of the veterinary profession, particularly in the larger centers of population. Members of this group generally become leaders in civic and industrial life and many of them have incomes which should lure young men to enter the veterinary schools and prepare for the ever-increasing demand for scientific treatment of small animals of sport, of pleasure, and of utility. Our work is to harmonize the art and science of small-animal medicine with general practice.

I thank you for the honor of having been elected your chairman and for the assistance you have given in getting up the wonderful program to be carried out at this meeting; and I trust that all future officers will be given the benefit of the support and wisdom that will make the Section on Small Animal Practice the pride of the American Veterinary Medical Association.

CHAIRMAN LACROIX: The next thing in order is the report of the Secretary, Dr. H. J. Milks.

DR. MILKS: You have a full program on your hands this morning, and I think you do not care much about a Secretary's report. But I want to tell you how we got up the program. In the first place, I would like to acknowledge the help I received from Dr. Whipple. It was a hard job, and required considerable correspondence to get together eight or ten papers. Dr. Whipple, I think, wrote as many letters as I did. It has been hard work to get the papers. The practitioners are bashful, perhaps. They like to hear the other fellow's paper, but do not like to prepare papers themselves, and you have to go after them and draft them, like the government, in order to get an army. They do not get volunteers, but they have to go after their army. The program, as far as I can judge, is along the lines of the practitioner.

One of the things that I would like to mention is, that if you have something that you would like to present to the meeting, do not wait until you are called upon. The Secretary does not know what you people have up your sleeves, and all he can do is to go after the men that he thinks are likely to give him papers. So do not be bashful. If you have anything, the Secretary will be glad to have it.

Another thing I would like to call your attention to is that when you write a paper, send it to the Secretary, so he will have time to send it to the man who will discuss it. It is pretty hard to discuss a paper with any intelligence, without having had an opportunity to go over it. I know they had to hound me last year for a paper, and we all put it off, I know, but I do think that when we plan a paper we ought to plan to have it ready at least two weeks previous to the meeting, so that the man selected to discuss it can discuss it intelligently.

I have no other report. I believe now would be a good time to read a telegram received from Doctor Brock, who was to be here and discuss a paper tomorrow. It is as follows:

I had made all plans and preparations to attend the meeting of the A. V. M. A. this week, when Mrs. Brock was taken seriously ill last Friday, and I do not feel like leaving here in her present condition. I hate to disappoint you and Dr. Noback in not being present to open the discussion on his valuable paper. Nevertheless, I am with you heart and soul. Trusting that the meeting will be a grand success and with best wishes.

W. G. BROCK.

(At this point in the proceedings, Dr. Frank H. Miller, of New York, occupied the chair.)

DR. FRANK H. MILLER: Dr. Lacroix, who is to read the next paper, is well known to you. He is down on the program to

speak on the subject, "Grading-Small Animal Hospitals," and I am sure it will be an interesting paper and that you will be glad to hear it, and, therefore, you will give your attention to him closely.

DR. LACROIX: I feel that my voice does not carry sufficiently and that I ought to mail this paper to you or forget it. I will attempt, however, to put it over, at the risk of being considered visionary, or an impractical idealist, or worse. I will present the paper which is, in fact, a brief outline of a plan suggested for the purpose of standardizing small-animal hospitals and for the purpose of standardizing some of the work of hospitalization of small animals. The idea, in part, is original, but, for the most part, patterned after the working of the American College of Surgeons in the hospital activities branch of that organization, and as it applies to the hospitalization of human beings in the medical profession, with very little modification, in so far as it is practical to apply it, we could, if we saw fit, apply it in our work, I believe, with profit to all.

Dr. Lacroix presented his paper.

Following the discussion of the paper by Dr. Lacroix the following papers were presented:

"The Small-Animal Dietitian," by Dr. F. E. McClelland.

"Does Specializing Pay?", by Dr. Frank H. Miller.

"Dogs and How to Care for Them," by Mr. F. F. Dole.

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CHAIRMAN LACROIX: I want to say that we have greatly enjoyed Mr. Dole's presentation and we are all reminded, of course, that the dog-hater does not know the dog. He has not taken the time to become acquainted with the dog, or else he is incapable of it.

The meeting adjourned at 12:15 p. m.

THURSDAY MORNING, September 15, 1927

The second session was called to order at 9:00 a. m., by Chairman Lacroix.

The first paper on the program was by Dr. J. A. Campbell, of Toronto, Canada, entitled, "Observations on Canine Obstetrics."

Dr. Campbell presented his paper.

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CHAIRMAN LACROIX: There has been an important subject that has come up that is of interest not only to our section, but to the whole Association. Dr. Miller has a word to say.

DR. FRANK H. MILLER: As you may perhaps know, there is a movement going on in England for the investigation of dog distemper. No doubt you are familiar with it. I have sent in a good deal of money from my clientele and there has been a committee organized by the American Kennel Club. It is purely in the interest of the dog. This committee has been financed, as far as possible, from this country, simply from the dog-breeders and lovers. When I was at the meeting at Watertown, New York, this letter came to me from Mr. C. H. Tyler, of the firm of Tyler, Eames, Wright and Hooper, the largest law firm in Boston. I do some business in New York for him. He is a very heavy man, a dog-owner and stands high in the dog world. His letter I will read:

TYLER, EAMES, WRIGHT & HOOPER,
Boston, June 28, 1927.

Frank H. Miller, Esq.,
Watertown, N. Y.

Dear Miller:

The whole question, it seems to me, in this distemper work, is: How can we get money from dog owners? I have in my office a card index which must contain the name of practically every owner of a registered dog in the United States. Of course, there are hundreds of people who have dogs eligible for registration who never register them, and the names of many of these I have as well. If I could send out a circular giving the stamp of approval from the national body of veterinarians, that would help and I think stir up interest. Further than that, and probably more important, would be the getting of such approval by the newspapers of the country, and I think I could be sure of getting it from practically every newspaper without expense. This would mean a great deal in the way of publicity and in the way of interesting people.

I am rather inclined to think from the past few years' experience, and so is Mr. Ames, that we have gotten more by newspaper and magazine publicity than any other way outside of what we have got from our own personal friends. To give you an idea of what I mean, I enclose you a form of circular which has been sent out by the American Kennel Club in its mail, also a form of circular which has been sent out by the American Field with its mail. Similar circulars have been sent out by Field & Fancy, Spratts, and other similar concerns.

I am just writing this letter to give you an idea of how we can best use the publicity which you are so generously trying to get. I am not losing sight of the fact that you are trying to get contributions—they will be most welcome—but the important thing is to have something that is to carry to possible or probable givers the stamp of approval from a large body of educated men.

I may say that this letter carries the approval of Dr. Wadsworth, who has been a tower of strength to me in this enterprise. He has enabled me to circularize the fox breeders, from whom I have got some money. He has given me statements of his own, one of which I enclose you, which we have sent out broadly all over the country. I add, for your own interest and information, that I obtained from the scientists in England a cabled statement that in their opinion distemper in foxes was probably the same thing as distemper in dogs.

Again thanking you for all you are doing, I am

Ever so truly yours,

(Signed) C. H. TYLER.

DR. MILLER (continuing): I am not trying to get publicity, but the veterinarians ought to sit up and take notice. These men are organized to do this work, and we ought to be on the firing-line before they get through financially. I am not making bids for support to be voted at the American Kennel Club, but the American Veterinary Medical Association. Now, these men have done us the honor of thinking they need endorsement of their work. They are people of note among dog men. They want to have their work supported by the men who ought to know the value of the work so they can be vouched for. That is quite apart from anything we would do as veterinarians.

That is the substance of that letter. I cannot see any possible objection that we can have to endorsing the movement, so long as it is not hitched up with veterinary practice by any resolution we might introduce here. In fact, the writer says he does not want it. He wants the endorsement of a body of scientific men, men who know the subject, so they can put up to these dog men the fact that the veterinarians of America stand back of this in open meeting. We need not feel that we are committing ourselves in any way to any outside influence that may be hitched up with the veterinary world. They want the endorsement of the work they are doing.

This is not a wildcat scheme, or a scheme just simply to scratch together to get all the money they can. But, as you know, the best people in England are back of this, and who can doubt the views and standing of this committee, when you have men like Dr. Theobald Smith on it? These men in London would be sufficient guarantee for me. I believe we had two men from Cornell University over there. They have seen the work of these men and pronounced the work to be well grounded and anchored to the ground, with good men back of it, and they have every prospect of advancing in that work. These men are appealing to us as veterinarians. We are doing dog business and I think it is up to us to consider the matter thoroughly.

We should appoint a committee here and pass resolutions at this time, now, and not wait for another year and give these men what they want and say that the veterinarians of America are back of this. I do not see any reason why we should feel that we are hitching up to something or advertising ourselves at the expense of somebody else. There are plenty of these things done in the medical profession and we all back the idea of issuing stamps at Christmas time for tuberculosis. That is not outside

of the medical profession. The medical profession recognizes the Red Cross and stands back of it.

I would like to hear your expressions on this matter and, if it is opposed, let us know the reason why. I have done the best I can. I have tried to help it as far as I could, because I find it is a good thing and it will be a long time before we can get that kind of an institution in America to pay our running expenses and keep up instruction at the rate it is going now. If we went to any legislature and asked for ten thousand dollars to start on this distemper question, we would have our budget cut to pieces. We would be afraid of our lives, if we asked Cornell for ten thousand dollars for the purpose of investigating dog distemper or any kin'd of dog disease. These men are working on their own responsibility to get the money, and we know this thing is all right and good. They are not asking for this money to put away. The American Kennel Club is a well-organized body and all they want us to do is to O. K. what they are doing. I think it is a worthy project and we should give it our backing.

DR. C. S. CHASE: There is no question about the worthiness of this cause. Some years ago there was an organized effort to have our United States Department of Agriculture interest itself in research work in distemper, but it was turned down. They have taken it up in England, however, and are doing fine work on it and I believe it will be in keeping with good business methods for this organization to go on record as favoring this work, and I move you, sir, that this resolution be referred to our Committee on Resolutions, with the recommendation that they favorably report its adoption.

DR. J. ELLIOTT CRAWFORD: I second the motion.

CHAIRMAN LACROIX: How can we refer it to the Committee on Resolutions, when we are not in the general body?

DR. CHASE: The Committee can consider it and bring it up before the general body for its consideration.

DR. CRAWFORD: Don't you think it would be better to refer it to the Committee on Distemper? Why should we do something that may not be agreeable to this Committee?

CHAIRMAN LACROIX: This places the Chair in a rather embarrassing position, particularly in view of the fact that the Chair happens to be a member of the Committee on Distemper and we have a resolution ready*to go in to be signed. That, however, does not need to block any expression that this section might make as a body and, if you modify your motion, Doctor,

I think the Chair will entertain it and we can vote on the matter and refer it in proper form.

DR. CHASE: It is agreeable to me to modify it to meet any arrangements which have already been made, but it seems to me that we ought to go on record as favoring that kind of work. They are doing some advanced work in England along this line, in finding a way to prevent distemper. If it is the wish of this section, that we stand in favor of the adoption of this matter, then it will be brought up before the Committee on Resolutions of the A. V. M. A. for their consideration, to present it to the general session on tomorrow afternoon and then, if it is the opinion of the entire body that we favor this action, it will go out as the action of the A. V. M. A. at its convention. It is agreeable to me to make any change or modification in the motion.

DR. MILLER: I do not think this can conflict at all with any report. I am trying to make that clear to you, that the American Kennel Club controls the dog industry of America. They are thoroughly well organized and what we do here today we can do without interfering. If we pass this resolution, we simply O. K. the work they are doing. They are thoroughly well organized, even more thoroughly than this organization. They have been in existence for over two years. They want to put this over and I think it is all right and I am for it. But this matter is not going to interfere one particle with the dog men. They sent thousands and thousands of dollars and they are not going to modify their course. We will not be drawing any of our strength from these men. I say again that I am heartily in favor of it, for I think it is a splendid move. The dog men will contribute their share towards it, because they believe they are going to win by it. We endorse the stamp movement for tuberculosis and this is along that line.

DR. EDW. T. RYAN: I want to say that I am heartily in favor of canine distemper work, but I do not think we should pass any resolution that would be binding on the general session or tell the general session what to do. I think we ought to go to the general session this afternoon and make a report at that time and Dr. Miller can read his letter then to the general session. I am in favor of bringing it before the general session and not taking up our time here.

DR. CRAWFORD: I do not think we will secure much publicity by passing a resolution in this section. I am in favor of submitting it to the general session.

DR. CHASE: I think the best plan would be to have this section go on record as favoring its adoption and let that go to the Committee on Resolutions to be presented to the general assembly.

CHAIRMAN LACROIX: Will you make your motion specific?

DR. CHASE: If it will facilitate matters, I will refer it to the Committee on Distemper.

CHAIRMAN LACROIX: Well, make the motion.

DR. CHASE: I do make the motion, to refer the whole matter to the Committee on Distemper.

DR. CRAWFORD: I second the motion.

DR. J. C. FLYNN: I am in favor of the motion. We ought to have the full approval of the Section to turn the entire matter over to the Committee on Distemper.

(The motion was unanimously agreed to.)

CHAIRMAN LACROIX: I think there is not a member of the Committee on Distemper who will oppose this movement. While our recommendations are not in keeping with that, there is nothing in our recommendations that will prevent the A. V. M. A. from endorsing the work being done in England.

DR. MILLER: I think we have handled the matter in a very satisfactory way.

CHAIRMAN LACROIX: The next paper is by Dr. Alexander Glass.

Dr. Glass delivered his address.

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CHAIRMAN LACROIX: I want to say to Dr. Glass that we have enjoyed his address very much. The next paper to be presented will be by Dr. C. P. Zepp, entitled, "The Setting of Fractured Bones in Small Animals."

Dr. Zepp read his paper.

* * *

DR. FLYNN: Mr. Chairman, it is now 12 o'clock noon and I think it is an injustice to ask any man to present a paper at this time. I, therefore, move that we take a recess until one o'clock, when we can discuss this paper, finish our program and have our election of officers.

DR. MILLER: I second the motion.

The motion was agreed to and, at 12 o'clock noon, the meeting of the Section was adjourned by the Chairman until one o'clock.

ADJOURNMENT.

The adjourned session was called to order at 1:00 p. m., by Chairman Lacroix.

CHAIRMAN LACROIX: The next paper on the program is by Dr. E. E. Patterson, of Detroit, entitled, "The Value of the X-ray in the Diagnosis and Treatment of Fractures in Small Animals."

Dr. Patterson presented his paper.

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At 2:00 p. m. the section again took a recess until 4:30 p. m., same day.

ADJOURNMENT.

The second adjourned session was called to order at 5:45 p. m., by Chairman Lacroix.

CHAIRMAN LACROIX: The next on our program is a paper entitled, "Ultraviolet Irradiation of Primates with a Form of Cage Paralysis (Rickets)," by Dr. C. V. Noback, of the New York Zoological Park, N. Y.

Dr. Noback presented his paper.

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DR. THOS. J. MAHAFFY: Mr. Chairman, I move that we give a rising vote of thanks to the retiring officers of this section and proceed to the election of officers.

DR. CRAWFORD: I second the motion.

The motion was agreed to.

DR. PATTERSON: I take great pleasure in nominating the present occupant of the chair, Dr. J. V. Lacroix, as chairman of the Section on Small Animal Practice for the coming year.

(At this point Dr. Crawford took the chair.)

DR. PATTERSON (continuing): I move that we elect Dr. Lacroix chairman for the coming year and that the Secretary be instructed to cast the ballot of the section in favor of Dr. Lacroix.

DR. RYAN: I second the motion.

The motion was agreed to unanimously.

SECRETARY MILKS: I hereby cast the ballot of the Section for Dr. J. V. Lacroix for chairman for the ensuing year.

ACTING CHAIRMAN CRAWFORD: Dr. Lacroix, will you take the chair?

CHAIRMAN LACROIX (resuming the chair): I wish to thank you for your token of confidence. It is appreciated, I assure you. I know very well there are many here more able than I and I am sorry that some one else was not chosen. Passing along in our

business, as it is getting late, the election of a secretary is next in order.

DR. H. W. BROWN: I nominate Dr. H. J. Milks, of Ithaca, N. Y., for the office of secretary.

DR. CRAWFORD: I second the nomination.

DR. ZEPP: And that the Chair cast the ballot of the Section for Dr. Milks as secretary.

The motion was agreed to unanimously.

CHAIRMAN LACROIX: I hereby cast the ballot of the Section for Dr. H. J. Milks as secretary of the Section on Small Animal Practice for the ensuing year.

DR. H. J. MILKS: I thank you, men. I do not think I need to make a speech. I will say one thing, however. I have the Section very much at heart and I hope you men will look at your hearts, too. No one man knows where the talent is and, if you have something to present and know of something that will be of interest to the Section, I will be extremely glad to have you come and jump in the boat, instead of having me to fish for it, as heretofore. Furthermore, if you know of some one else who might have a paper who might be too modest about coming forward with it, just let us have a chance to write him and we assure you that we will be glad to do anything we can. It is quite a job to get up a program. I am not complaining and I want you to understand me thoroughly. No one knows all the places to get papers and the whole section wants good papers and I want your cooperation to get them.

CHAIRMAN LACROIX: Is there anything else to be brought before the Section? The Chair fails to hear anyone.

DR. FLYNN: I move that we now adjourn.

DR. RYAN: I second the motion.

The motion was agreed to.

Whereupon, at 6:45 p. m., Thursday, September 15, 1927, the Section on Small Animal Practice adjourned *sine die*.

ADJOURNMENT.

ALUMNI MEETINGS AT PHILADELPHIA

ALABAMA POLYTECHNIC INSTITUTE

The graduates of the Alabama Polytechnic Institute who attended the A. V. M. A. meeting at Philadelphia partook of a sea-food dinner on the night set apart for alumni meetings. Those in attendance were Dr. and Mrs. E. T. Hallman, of

East Lansing, Mich.; Dr. and Mrs. Ward Giltner, of East Lansing, Mich.; Dr. B. T. Simms, of Corvallis, Ore.; Dr. R. R. Salley, of Orangeburg, S. C.; Dr. Fred W. Miller, of Washington, D. C.; and Dr. C. A. Cary, of Auburn, Ala. Reminiscent conversations over college days and the work of the A. V. M. A. were the main features of the dinner, outside of the vigorous attack on sea bass, shrimp and sea crabs. The dinner was a most enjoyable hour for all.

C. A. C.

CORNELL UNIVERSITY

The dinner of the Cornell Veterinary Alumni Association was held at the Walton Hotel, with fifty-eight in attendance. Several alumni were present at the meeting who were not able to attend the dinner. The following alumni were in attendance at the meeting:

- Dr. P. A. Fish ('99), Ithaca, N. Y.
Dr. G. T. Stone ('00), Binghamton, N. Y.
Dr. R. C. Reed ('01), College Park, Md.
Dr. C. E. Shaw ('01), Brooklyn, N. Y.
Dr. D. H. Udall ('01), Ithaca, N. Y.
Dr. H. J. Milks ('04), Ithaca, N. Y.
Dr. F. W. Andrews ('05), Mt. Kisco, N. Y.
Dr. W. W. Dimock ('05), Lexington, Ky.
Dr. C. H. Taylor ('05), Cortland, N. Y.
Dr. Ward Giltner ('06), East Lansing, Mich.
Dr. J. G. Wills ('06), Albany, N. Y.
Dr. J. B. Drew ('07), Binghamton, N. Y.
Dr. J. N. Frost ('07), Ithaca, N. Y.
Dr. A. T. Gilyard ('07), Waterbury, Conn.
Dr. Thos. Sheldon ('07), Rineback, N. Y.
Dr. Cassius Way ('07), New York, N. Y.
Dr. E. Sunderville ('08), Ithaca, N. Y.
Dr. J. H. Hewitt ('09), Gouverneur, N. Y.
Dr. Geo. W. Little ('09), New York, N. Y.
Dr. J. McCartney ('09), Middletown, N. Y.
Dr. F. E. McClelland ('09), Buffalo, N. Y.
Dr. H. B. Risley ('09), Brooklyn, N. Y.
Dr. C. A. Roig ('10), Poughkeepsie, N. Y.
Dr. J. H. Stack ('10), Syracuse, N. Y.
Dr. C. V. Noback ('11), New York, N. Y.
Dr. E. M. Pickens ('11), College Park, Md.
Dr. Roy Rowe ('11), Millerton, N. Y.
Dr. Robert Simms ('11), Morristown, N. J.
Dr. I. R. Vail ('11), Bristol, Conn.
Dr. R. R. Birch ('12), Ithaca, N. Y.
Dr. R. R. Bolton ('12), Newburgh, N. Y.
Dr. M. W. Sullivan ('12), Marcellus, N. Y.
Dr. Edw. L. Wilson ('12), Bath, N. Y.
Dr. Chas. A. Griffin ('13), Albany, N. Y.
Dr. J. C. Wheat ('13), Syracuse, N. Y.
Dr. C. E. Hayden ('14), Ithaca, N. Y.
Dr. C. B. Skinner ('14), Cobleskill, N. Y.
Dr. Roy S. Youmans ('14), Lawrence, Mass.
Dr. J. F. Jansen ('15), Oneonta, N. Y.

- Dr. J. J. Regan ('15), New York, N. Y.
Dr. J. F. Shigley ('15), State College, Pa.
Dr. R. H. Spaulding ('15), White Plains, N. Y.
Dr. W. W. Williams ('15), Springfield, Mass.
Dr. C. S. Webster ('15), Utica, N. Y.
Dr. I. E. Altman ('16), Brooklyn, N. Y.
Dr. H. G. Hodges ('16), Owego, N. Y.
Dr. W. M. Long ('16), Baldwinsville, N. Y.
Dr. F. F. Russell ('16), Concord, N. H.
Capt. L. L. Shook ('16), Baltimore, Md.
Dr. C. M. Carpenter ('17), Ithaca, N. Y.
Dr. G. W. Derrick ('17), Ithaca, N. Y.
Dr. A. G. Gierke ('17), Clyde, N. Y.
Dr. H. L. Gilman ('17), Ithaca, N. Y.
Dr. H. D. Laird ('17), Whitehall, N. Y.
Dr. L. E. Moore ('17), Amsterdam, N. Y.
Dr. W. D. Way ('17), Westport, N. Y.
Capt. F. H. Woodruff ('17), Veterinary Corps, U. S. A.
Dr. S. N. Blackberg ('18), New Orleans, La.
Dr. F. W. Cruickshanks ('18), Hagerstown, Md.
Dr. J. M. Flannery ('18), Bainbridge, N. Y.
Dr. H. F. Fleming ('18), Gardiner, N. Y.
Dr. B. J. Finkelstein ('18), Brooklyn, N. Y.
Dr. D. B. Jenkins ('18), Oxford, N. Y.
Dr. W. C. Snyder ('18), Watertown, N. Y.
Dr. E. S. Stone ('18), Waverly, Pa.
Dr. W. E. Parks ('19), Chatham, N. Y.
Dr. C. P. Zepp ('19), New York, N. Y.
Dr. E. R. Cushing ('20), New Brunswick, N. J.
Dr. Roy C. Johnston ('20), Livingston Manor, N. Y.
Dr. A. M. Mills ('20), Goshen, N. Y.
Dr. A. H. Russell ('20), Concord, Mass.
Dr. J. R. Varley ('20), New Brunswick, N. J.
Dr. J. F. Bullard ('22), Lexington, Ky.
Dr. C. R. Roberts ('22), Norwich, N. Y.
Dr. C. B. Cain ('23), A. & M. College, Miss.
Dr. L. H. Conlon ('23), Vergennes, Vt.
Dr. C. B. Freer ('23), Ellenville, N. Y.
Dr. W. R. Crawford ('24), Westminster, Md.
Dr. C. L. Kern ('24), Middletown, N. Y.
Dr. W. K. Nugent ('25), Richmond Hill, N. Y.
Dr. A. F. Schoenfeld ('25), Philadelphia, Pa.
Dr. M. L. Morris ('26), New Brunswick, N. J.
Dr. Peter Olafson ('26), Ithaca, N. Y.

Dr. R. R. Birch was in charge of arrangements and Dean Moore presided. Dr. Cassius Way and Dr. D. H. Udall gave short talks. It was voted to send an expression of sympathy to Mrs. V. G. Kimball on account of the death of our beloved alumnus, Dr. V. G. Kimball.

The gathering was honored by the presence of Dr. B. Bang, of Copenhagen, Denmark. Dr. Adalyn F. Schoenfeld, of Philadelphia, was the representative of the three women who have received the degree of D. V. M. from Cornell.

C. E. H.

IOWA STATE COLLEGE

Iowa State College alumni and friends had dinner together at the Arcadia, Tuesday evening, September 13. Those present were:

- Dr. Geo. C. Faville ('79) and wife, Phoebus, Va.
- Dr. Guy G. Graham ('08), Kansas City, Mo.
- Dr. H. E. Bemis ('08), Philadelphia, Pa.
- Dr. N. N. Crawford ('09), Baltimore, Md.
- Dr. H. H. Havner ('11), State College, Pa.
- Dr. I. D. Wilson ('14), Blacksburg, Va.

Dean Stange was unable to attend the dinner, having accepted an invitation to address the Bala-Cynwyd-Narberth Rotary Club the same evening. Glen Kirkpatrick ('17), Philadelphia, of the Farm Journal staff, joined the group for the evening, as did Dr. C. H. Covault, member of the veterinary faculty at Ames.

After dinner those present swapped yarns and recalled incidents which had taken place on the campus at Ames, during college days. Dr. Havner explained why it was that the campus was so free of dogs during the time that he was at college. Dr. Faville told of the time when he turned Bradford Knapp over his knee for a spanking, all of which brought young Bradford another thrashing from his father, Seaman Knapp.

G. K.

NEW YORK UNIVERSITY

The alumni of New York University gathered in the Pink Room of the Bellevue-Stratford for their annual get-together. Dr. G. W. Hollingworth acted as toastmaster. Those in attendance were:

- Dr. E. B. Ackerman ('91) and wife, Huntington, N. Y.
- Dr. Henry Amling ('93), New York, N. Y.
- Dr. I. K. Atherton ('93) and wife, College Park, Md.
- Dr. Geo. H. Berns ('79) and daughter, Brooklyn, N. Y.
- Dr. Chas. S. Chase ('06), Bay Shore, N. Y.
- Dr. H. B. Cox ('95), Philadelphia, Pa.
- Dr. J. Elliott Crawford ('04), Far Rockaway, N. Y.
- Dr. J. F. DeVine ('98), Goshen, N. Y.
- Dr. M. W. Drake ('90), Philadelphia, Pa.
- Dr. Adolph Eichhorn ('00) and wife, Pearl River, N. Y.
- Dr. James T. Glennon ('96) and wife, Newark, N. J.
- Dr. W. G. Hollingworth ('84), Utica, N. Y.
- Dr. Leland D. Ives ('96), Elizabeth, N. J.
- Dr. Wm. Henry Kelly ('89), wife and daughter, Albany, N. Y.
- Dr. Geo. A. Knapp ('95), Millbrook, N. Y.
- Dr. Hermann Koch ('91), Brooklyn, N. Y.
- Dr. J. Payne Lowe ('91) and wife, Passaic, N. J.
- Dr. Wm. Herbert Lowe ('83 and '88), Paterson, N. J.
- Dr. C. G. Rohrer ('08), New York, N. Y.
- Dr. F. P. Ruhl ('85), Milford, Del.
- Dr. W. C. Siegmund ('94), Harrisburg, Pa.

Dr. Arthur W. Smith ('98) and wife, West Orange, N. J.
Dr. Wright J. Smith ('95), Kingston, N. Y.
Dr. A. J. Tuxill ('94), Auburn, N. Y.

W. G. H.

UNIVERSITY OF PENNSYLVANIA

The largest gathering of veterinary alumni of the University of Pennsylvania in many years took place in the Clover Room of the Bellevue-Stratford Hotel, Tuesday evening, September 13, 1927. Dr. Joseph G. Moon, president of the University of Pennsylvania Veterinary Alumni Society, presided. The following alumni were in attendance:

- Dr. John P. Turner ('90), Washington, D. C.
Dr. C. E. Cotton ('93), Minneapolis, Minn.
Dr. H. W. Turner ('93), New Hope, Pa.
Dr. C. J. Marshall ('94), Philadelphia, Pa.
Dr. A. G. G. Richardson ('94), Athens, Ga.
Dr. C. W. Boyd ('95), Sewickley, Pa.
Dr. L. A. Klein ('97), Philadelphia, Pa.
Dr. M. Jacob ('99), Knoxville, Tenn.
Dr. F. H. Bradley ('02), Plymouth, Mass.
Dr. F. U. Fernsler, ('02), Lebanon, Pa.
Dr. B. T. Woodward ('02), Washington, D. C.
Dr. E. P. Althouse ('03), Sunbury, Pa.
Dr. C. M. Hench ('03), Waynesboro, Pa.
Dr. G. A. Dick ('04), Philadelphia, Pa.
Dr. T. E. Munce ('04), Harrisburg, Pa.
Dr. T. J. Mahaffy ('05), Jacksonville, Fla.
Dr. C. W. Springer ('05), Uniontown, Pa.
Dr. S. E. Bruner ('06), Harrisburg, Pa.
Dr. J. E. Gregory ('06), Stroudsburg, Pa.
Dr. Thomas Kelly ('06), Llanerch, Pa.
Dr. John Reichel ('06), Glenolden, Pa.
Dr. C. S. Rockwell ('06), Philadelphia, Pa.
Dr. Frank E. Lentz ('07), Philadelphia, Pa.
Dr. H. W. Schoening ('07), Washington, D. C.
Dr. F. S. Jones ('08), Princeton, N. J.
Dr. Thos. D. James ('08), Scranton, Pa.
Dr. H. W. Jakeman ('09), Boston, Mass.
Dr. E. T. Booth ('09), Philadelphia, Pa.
Dr. Garland Finney ('09), Onancock, Va.
Dr. Harry F. Leighton ('09), Pontiac, Mich.
Dr. Wm. J. Lee ('09), Philadelphia, Pa.
Dr. H. W. Barnes ('10), Thompson, Pa.
Dr. F. H. Chandler ('10), Miners Mills, Pa.
Dr. B. P. Chodos ('10), Lancaster, Pa.
Dr. John J. Griffith ('10), Bradford, Pa.
Dr. H. Preston Hoskins ('10), Detroit, Mich.
Dr. M. E. Maddocks ('10), Augusta, Me.
Dr. Geo. T. Smith ('10), Hughesville, Pa.
Dr. J. H. Winstanley ('10), Philadelphia, Pa.
Dr. M. F. Barnes ('11), Philadelphia, Pa.
Capt. E. M. Curley ('11), Ithaca, N. Y.
Dr. F. P. Caughman ('11), Columbia, S. C.
Dr. E. C. Deubler ('11), Ithan, Pa.
Dr. H. H. Haigh ('11), Trenton, N. J.
Dr. B. Kater McInnes ('11), Charleston, S. C.
Dr. J. J. Flaherty ('12), New Haven, Conn.

- Dr. R. A. Greenwood ('12), Painesville, Ohio.
Dr. M. B. Herron ('12), Canonsburg, Pa.
Dr. Ira Mitterling ('12), Hollidaysburg, Pa.
Dr. W. C. Reeder ('12), Lewes, Del.
Dr. E. C. Cleveland ('13), Cattaraugus, N. Y.
Dr. C. F. Davis ('13), Rumford Falls, Me.
Dr. C. P. Bishop ('14), Sunbury, Pa.
Dr. S. T. Howland ('14), Whitman, Mass.
Dr. R. B. Little ('14), Princeton, N. J.
Dr. J. B. Lentz ('14), Amherst, Mass.
Dr. R. P. Head ('15), Malvern, Pa.
Dr. Jos. G. M. De Vita ('16), New Haven, Conn.
Dr. J. G. Hardenbergh ('16), Plainsboro, N. J.
Dr. J. G. Moon ('16), Philadelphia, Pa.
Dr. H. A. Milo ('16), Lancaster, Pa.
Dr. C. F. Bennett ('17), Corry, Pa.
Dr. J. G. Bailey ('17), Milton, Pa.
Dr. J. W. Hastings ('17), Cambridge, Md.
Dr. J. J. Thomas ('17), Pittsburgh, Pa.
Dr. B. Scott Fritz ('17), Harrisburg, Pa.
Dr. Sherman Ames ('18), Easton, Pa.
Dr. H. E. Biester ('19), Ames, Iowa.
Dr. E. D. Diehl ('20), Philadelphia, Pa.
Dr. R. C. Dayton ('20), Philadelphia, Pa.
Dr. B. C. McLean ('20), Aiken, S. C.
Dr. H. B. Prothero ('20), Johnstown, Pa.
Dr. H. G. Ricker ('20), Millheim, Pa.
Dr. R. O. Biltz, ('22), Philadelphia, Pa.
Dr. E. A. Wilson ('23), Hackettstown, N. J.
Dr. D. W. Gates ('25), Howard, Pa.
Dr. J. K. Strockbine ('26), Bedford, Pa.
Dr. A. S. Vansant ('27), Philadelphia, Pa.

After the dinner had been served, Dr. Moon called upon the following for brief addresses: Prof. B. Bang, Dean Klein, Dr. C. J. Marshall, Dr. C. E. Cotton, Col. W. Geo. Turner, Director, Veterinary Corps, United States Army; Dr. Benjamin McInnes, who was the guest of his son, Kater; and Dr. H. Preston Hoskins, Secretary-Editor of the A. V. M. A.

E. T. B.

UNITED STATES COLLEGE OF VETERINARY SURGEONS

A meeting of the alumni of the United States College of Veterinary Surgeons, who were in attendance at the Philadelphia meeting, was held at the Bellevue-Stratford Hotel, September 6, 1927, with the following in attendance: Drs. Geo. E. Corwin ('03), State Veterinarian, Hartford, Conn.; J. D. Foster ('03), practitioner, Newtown, Pa.; H. N. Guilfoyle ('07), B. A. I., Hartford, Conn.; G. H. Grapp ('08), veterinarian to Maryland State Board of Agriculture, Baltimore, Md.; J. G. Ferneyhough ('99), former state veterinarian of Virginia, Richmond, Va.; R. E. Brookbank ('09), B. A. I., Richmond, Va.; T. P. Polk ('10), University of

Kentucky, Lexington, Ky.; H. C. Givens ('13), State Veterinarian, Richmond, Va.; and Wm. Moore ('11), State Veterinarian, Raleigh, N. C.

W. M.

CONVENTION NOTES

Maryland swelled the attendance figures with fifteen registrations. From College Park, Drs. I. K. Atherton, E. M. Pickens and R. C. Reed; from Baltimore, Drs. N. N. Crawford and G. H. Grapp; from the U. S. Army, Captains Seymour, Shook and Woodruff; Drs. F. H. Benjamin and F. H. Mackie, North East; Drs. F. W. Cruickshanks and E. C. Poe, Hagerstown; Dr. William R. Crawford, Westminster, Dr. J. Walter Hastings, Cambridge, Dr. J. W. Hughes, Ammendale.

Massachusetts was represented by approximately one-third of her membership: Drs. Frederick H. Bradley, Plymouth; Edward F. Carey, Fall River; E. A. de Varennes, Quincy; W. H. Dodge, Leominster; H. N. Eames, Lowell; H. B. Hamilton, New Bedford; S. T. Howland, Whitman; F. D. Landon, Great Barrington; John B. Lentz and F. G. Reeder, Amherst; L. A. Paquin, Webster; R. H. Sewell, Milton; Ray S. Youmans, Lawrence; Walter R. Carroll and Edw. T. Ryan, Brookline; J. D. Pierce and W. W. Williams, Springfield; William J. Hennessey, William F. McNamara and W. L. Thayer, Worcester; E. A. Crossman, H. W. Jakeman and Rudolph H. Schneider, Boston; and Alden H. Russell, Concord.

Buckeye members turned out in force. There were twenty-six registered, as follows: Dr. F. E. Anderson, Findley; Dr. H. E. Ash, Bowling Green; Dr. W. A. Axby, Harrison; Drs. O. V. Brumley, H. H. Fairbank, L. W. Goss, Jas. D. Grossman and David S. White, Columbus; Dr. G. H. Chandler, Upper Sandusky; Dr. S. R. Craver, Youngstown; Dr. E. A. Downs, Mt. Sterling; Dr. E. B. Frederick, Canton; Dr. R. A. Greenwood, Painesville; Dr. B. W. Groff and Dr. C. D. Smith, Massillon; Dr. Reuben Hilty, Toledo; Dr. H. A. Hoopes, La Rue; Dr. H. M. Manley and Dr. Walter Shaw, Dayton; Dr. Byron P. Merrick, Berlin Heights; Dr. J. R. Merrick, Oberlin; Dr. V. H. Miller, Hamilton; Dr. Geo. S. Place, St. Marys; Dr. James E. Stansbury, Athens; Dr. O. L. Sutton, Cincinnati; Dr. E. Ziegenbusch, Delphos.

ASSOCIATION MEETINGS

NEW HAMPSHIRE VETERINARY MEDICAL ASSOCIATION

The semi-annual meeting of the New Hampshire Veterinary Medical Association was held at Concord and called to order by Dr. Fay F. Russell, on August 18, 1927, in one of the large rooms of Dr. Russell's modern and artistically planned home. While the meeting was going on, Mrs. Russell was busy entertaining the wives and friends of the members.

Before taking up the regular program, President Russell asked Dr. B. W. Smith to announce the sudden death of Dr. H. S. Perley, who had died a few days before. Dr. Smith, in a very kindly way, referred to Dr. Perley's life and his activities and loyalty to his fellow-veterinarians and the New Hampshire Association. President Russell then appointed a committee, consisting of Dr. R. W. Smith, Dr. E. A. Crossman and Dr. W. B. Mowers, to draft suitable resolutions in memory of Dr. Perley, a copy of which to be sent to Mrs. Perley; also a resolution of condolence to be sent to Dr. C. E. Swail, of Colebrook, N. H., who recently suffered the loss of his wife.

Dr. J. F. DeVine, of Goshen, N. Y., was the first speaker on the program. He took as his subject four cases he had visited the day before with Dr. Russell. One case was a valuable cow that Dr. DeVine had treated with Dr. Russell about a year previously. She had been giving quite a bit of trouble, due to endometritis and cystic ovaries. Dr. Russell followed up the treatment and later advised breeding her. She was bred a couple of times and then heat periods ceased. As she was growing very fat, the owner began to feel she had not conceived. Diagnosis was that she was pregnant, somewhere between five and one-half and six and one-half months. Upon looking up the last breeding date it was found that she had been bred just six months previously.

Dr. DeVine explained that the calf could not be palpated at that age, either by the flank or per rectum, but from the fact that the uterus was pulled forward and the artery enlarged and pulsating, a diagnosis of pregnancy could be made. He warned novices to watch out for such cases and not send them to the block, as so many have been.

Another case presented for diagnosis of pregnancy was found to be twelve weeks pregnant. Another was a heifer with right ovary drawn forward and adherent so much that the tube could not be outlined. The left ovary was normal and functioning, as was evidenced by the corpus luteum. There was also a slight catarrhal condition of the vagina and cervix. The heifer had been repeatedly bred without success, as is so often the case when the right ovary is not normal or not functioning. Treatment was hot douching, daily, for a while, then occasionally and breed early and late at each estrual period.

Another case was a mature cow that was treated by Dr. DeVine and Dr. Russell, three years previously, suffering with a chronic endometritis, cystic ovaries and cervicitis. Treatment at that time was mineral yeast, metritis bacterins, massaging and hot douching. The cow responded to this treatment and has since dropped two normal calves. Her present condition indicated that she needed the same treatment and it was advised that mineral yeast be added to her ration constantly, to prevent a recurrence of the trouble, as she is a heavy producer.

The next speaker was Dr. E. A. Crossman, who spoke on "Mistakes in Diagnosis of Pregnancy." He recited an experience where a dairyman had bought some valuable cows subject to veterinary examination. They were sold to be with calf but the veterinarian pronounced them all barren. The outcome was that the buyer and seller agreed to have the animals slaughtered and if they were found not with calf the seller agreed to refund the purchase money. All animals proved to be carrying good-sized calves. This emphasized the danger of diagnosing six-months pregnancy, of which Dr. DeVine had spoken.

Dr. Harry Jenkins spoke on the subject of "Rabies" and he asked the cooperation of all practitioners in discouraging the practice of giving a single inoculation of rabies vaccine to dogs that have been bitten by rabid animals. The single dose is not effective in such cases and it is an injustice to this biologic, which has merit if properly used.

Drs. E. M. Gildow and Walter Wisnicky, of New Hampshire State College, spoke briefly and very practically on fowl typhoid and its differentiation from fowl cholera. We wonder if the poultrymen of New Hampshire appreciate what it means to have such capable men at their service.

Others who took part in the general debate that followed and added to the interest of the meeting were: Drs. A. L. Edmunds,

of Franklin; H. M. Lewis, of Nashua; W. B. Mowers, of Lebanon, and F. S. Gray, of Plymouth.

The meeting then adjourned to enjoy some refreshments and to listen to and enjoy an unusual musical program given by the talented daughters and son of Mr. and Mrs. Robert Stobie, neighbors and friends of our hosts.

We next inspected one of the largest and most modern veterinary infirmaries in the East. A structure of splendid architecture set on the hillside, beautified in front by well-kept lawns and flower beds and flanked by several groves of majestic pines, where both large and small animals are allowed to run in every comfort that Nature affords. The building proper is arranged with receiving-room, offices, operating-room, wards for surgical cases and various wards with steel kennels for the everyday cases. The entire building is sanitary in construction, with all modern improvements, such as light, heat, sewerage and water.

Ye scribe has seen most of the territory of this old Dominion, but nowhere have we seen a better-trained and more ethical lot of veterinarians than the New England States can boast of and Dr. Fay F. Russell, president and host of the Association, stands in the first rank. His home, the wonderful cooperation that he receives from his wife and the splendidly appointed and professionally kept hospital are commented upon by every progressive veterinarian who knows the Russells.

Dr. Russell is fortunate in having the able assistance of a fine young man, Dr. K. W. Keyes, who was graduated from Cornell recently. And Dr. Keyes is a fortunate young man to have the opportunity in training that he is enjoying.

J. F. DEVINE, *Reporter.*

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The opening fall meeting of the Veterinary Medical Association of New York City was held at the Miller Dog and Cat Hospital, 128 W. 53rd St., New York City, October 5, 1927. President C. G. Rohrer presided. Attendance—39. The minutes of the May meeting were read and approved.

Drs. Harry Ticehurst and E. R. Cushing reported on the New Jersey State meeting, which was held at Atlantic City, June 20-21-22, 1927.

Dr. C. S. Chase reported on the New York State meeting, held at Watertown, N. Y., June 28-29-30, 1927.

Dr. R. S. MacKellar reported on the 64th annual meeting of the A. V. M. A., held at Philadelphia, Pa.

Dr. Ticehurst brought before the Association reciprocity of states. Discussion was entered into by Drs. Gannett, Latiner and MacKellar.

The applications of Drs. Edward R. Cushing and Norris, of New Brunswick, N. J., were brought before the Association for election to membership. After being favorably recommended and passed by the Board of Censors, the Association instructed the secretary to cast a unanimous ballot for the election to membership of Drs. Cushing and Norris.

The Association instructed the Secretary to send a letter of condolence to the kin of Dr. William Gall, of Matawan, N. J., who died June 25, 1927, and of Dr. J. F. Arnold, of Brooklyn, N. Y., who died September 13, 1927.

The meeting was then adjourned and turned over to the hospital for clinical cases.

C. P. ZEPP, *Secretary.*

UTAH VETERINARY MEDICAL ASSOCIATION

The seventeenth annual meeting of the Utah Veterinary Medical Association was held in the Capitol, Salt Lake City, October 7, 1927, with a good attendance from all over the state.

The program was led by Dr. W. H. Hendricks, State Veterinarian, who discussed anthrax vaccination and the retesting of imported cattle held in quarantine. (The Utah regulations require that dairy and breeding cattle be held in quarantine for a period of sixty days, after entering the State, and then shall be retested by two regulation methods, at the expense of the owner.)

Dr. H. J. Frederick, of the Utah Agricultural College, spoke on swine associations selling hogs to the farmers on contracts, and said the Extension Division was not in favor of the contracts. Dr. Frederick also discussed poultry diseases.

Dr. Hugh Hurst spoke on "The County Agents and Their Work." The consensus of opinion of the members present seemed to be that the agents gave valuable assistance to the veterinarians.

Officers elected for the ensuing term were: President, Dr. John W. Chambers, Garland; vice-president, Dr. A. C. Johnson, Cedar City; secretary-treasurer, Dr. E. A. Bundy, Ogden.

After a general discussion of matters of general interest to the members, the meeting adjourned.

E. A. BUNDY, *Secretary.*

NORTHEASTERN PENNSYLVANIA VETERINARY MEDICAL CLUB

A meeting of the Northeastern Pennsylvania Veterinary Medical Club was held October 28, 1927, at the International Correspondence School Certified Dairy Farm, located at Dalton, Pa., at which time Dr. G. A. Dick, of the University of Pennsylvania, gave a very interesting talk on "The Principles of Breeding," which was very instructive to all those present.

Dr. T. E. Munce, State Veterinarian, also gave some data on "Vaccination of Hogs Against Hog Cholera," which has reduced the disease considerably in Pennsylvania. The question of abortion in cattle was also taken up. At the present time, this question is under the supervision of the state authorities, along with the problem of the eradication of tuberculosis in cattle, and through the cooperation of the federal and state governments, tuberculosis among cattle is being rapidly reduced.

Immediately following the talk given by Dr. Munce, Dr. H. R. Church, Deputy State Veterinarian, informed the veterinarians of the cooperation that is existing in the State at the present time between the allied agricultural associations and the Pennsylvania State Veterinary Medical Association.

It was a great pleasure to the veterinarians and their lady friends to have the privilege of visiting the I. C. S. Farm and having the opportunity of inspecting the plant. This certified dairy farm is one that the veterinarians in the immediate neighborhood are very proud of and contains approximately 266 milking cows that are under the supervision of the Kings County Milk Commission of New York. These cattle are tuberculin tested at least every six months, so that they are kept apparently free from tuberculosis. The attendants, who are working around the premises, are examined at least once a week and the families of the attendants are also watched, so that no communicable diseases can be conveyed from the attendants to the cattle. All attendants working around the cattle must have clean white suits daily and wash their hands before each cow is milked. All utensils are sterilized before each milking and new bottles are used, therefore, there is no danger of contamination from second-hand bottles. This milk is sold to the Woodlawn Farm Dairy, at Scranton, Pa., and also to the Sheffield Farms, in New York.

T. D. JAMES, *Secretary.*

SOUTHEASTERN MICHIGAN VETERINARY MEDICAL ASSOCIATION

The first fall meeting of the Southeastern Michigan Veterinary Medical Association was held October 12, 1927, at the Detroit Board of Health headquarters. Thirty-three veterinarians were in attendance. Drs. Kenneth Ross and C. W. Eddy, both of Detroit, were admitted to membership.

The program was opened with the showing of the film "Molly of Pine Grove." This film was secured from the U. S. Department of Agriculture and depicted some of the difficulties encountered in the work of tick eradication in the South.

Dr. Reuben Hilty, of Toledo, Ohio, president of the American Veterinary Medical Association, was in attendance and delivered a short address on the value of association work. This was the first meeting to be attended by Dr. Hilty, following his election to the presidency of the A. V. M. A., and it was the first time that the Association had ever been honored with the presence of the president of the A. V. M. A.

Reports were then received from the following members who had attended the Philadelphia meeting of the A. V. M. A. in September: Dr. A. S. Schlingman and Dr. E. E. Patterson, of Detroit; Dr. Ward Giltner, of East Lansing; and Dr. L. H LaFond, of Flint.

The Secretary reported that the invitation had been extended to the A. V. M. A. to meet in Detroit in 1929 and this was followed by considerable discussion. Dr. L. A. Wileden, of Mason, Mich., president of the Michigan State Veterinary Medical Association, was present and asked for suggestions as to the best means for putting forth efforts to secure the 1929 convention. After considerable discussion, a motion prevailed authorizing Dr. Wileden to appoint a committee to take in charge the matter of getting the meeting for Michigan. Dr. F. A. Lambert, of Columbus, Ohio, was present and he gave it as his opinion that a good many of the Ohio veterinarians would be very glad to see Detroit secure the meeting, as there were a large number of veterinarians in Ohio who were actually closer to Detroit than many of the veterinarians in Michigan. Dr. Wileden promised to announce the personnel of the committee, which had been authorized, at an early date, so that the members of the committee could get to work.

NOVEMBER MEETING

The regular monthly meeting was held November 9, 1927, at the Detroit Board of Health headquarters, with twenty-one veterinarians in attendance. The usual dinner preceded the evening program, which was opened with the showing of the film, entitled, "Sir Loin of T-Bone Ranch." This was secured from the U. S. Department of Agriculture through Dr. E. P. Schaffter.

Dr. C. W. Eddy, of Detroit, then addressed the members on his experiences in Florida and Cuba. A year or so ago, Dr. Eddy made a tour through the South and spent about a year in different parts of Florida. He made it a point to visit veterinarians in the different cities that he passed through and he made quite a study of veterinary conditions in Florida. He said that most members of the profession appeared to have good practices and that in quite a number of cases the veterinarians were acting in the capacity of local health officers. After about a year in Florida, Dr. Eddy went to Cuba to accept a very attractive position with a large dairy farm. His experiences in Cuba were even more interesting and some of them were very amusing.

Dr. E. E. Patterson, of Detroit, then read the paper which he had presented at the Philadelphia meeting of the A. V. M. A., entitled, "The Value of the X-Ray in the Diagnosis and Treatment of Fractures in Small Animals." This was illustrated with some very fine lantern-slides made from the skiagraphs of cases referred to by Dr. Patterson in his paper. He also exhibited mounted specimens of bones from some of these cases, showing the fractures and methods of repair in different stages of healing. A general discussion followed and it was the consensus of opinion that the X-ray was an almost indispensable adjunct to the equipment of the modern veterinarian, especially in small-animal work. Almost without exception, clients are favorably impressed when a veterinarian uses modern methods in his practice. Clients are now demanding more in the way of services from the veterinarian and the latter must be prepared to render satisfactory services or the client will go to somebody else.

The meeting adjourned at 10:30 p. m.

H. PRESTON HOSKINS, *Secretary.*

I don't fear radicalism; I do fear the by-products or effects of hide-bound conservatism.—*DeWitt Wing in The Breeder's Gazette.*

NECROLOGY

JOSEPH R. JEFFERIS, V. C., U. S. A., Ret.

Lt. Colonel Joseph R. Jefferis died September 15, 1927, at Indianapolis, Ind., where he had made his home since retirement from active Army service, September 21, 1922.

Born November 8, 1866, at Wilmington, Delaware, Colonel Jefferis received his veterinary education at the University of Pennsylvania. He was a member of the class of 1893. Following his graduation he entered the Army Veterinary Service and served in Cuba for three years, in the Philippine Department for six years, with the American Punitive Expedition in Mexico (1916) for one year, and in France for two years. The last six years of this period of over twenty-one years of service were spent as a commissioned officer in the Veterinary Corps of the Regular Army.

Colonel Jefferis joined the A. V. M. A. in 1910 and retained his membership up until his death. In his passing goes one of the old-time veterinary officers who was well known to many of the old Army. He held the liking and respect of all who knew him and was ever pleasant and cheerful in the performance of his duties.

W. G. T.

AQUILA MITCHELL, V. C., U. S. A.

Lt. Colonel Aquila Mitchell died October 16, 1927, following injuries received when he fell from his horse at Fort Oglethorpe, Ga.

Born April 29, 1870, in Leeds, England, Colonel Mitchell came to this country and established his home at Skaneateles, N. Y. He attended the American Veterinary College and was graduated in 1895. He joined the A. V. M. A. in 1905.

Colonel Mitchell had the following service in the Army:

Veterinary Sergeant, 4th New York Light Artillery, during Spanish-American War, July 21, 1898, to October 21, 1898.

Veterinarian with 5th U. S. Cavalry, July 24, 1900, to January 8, 1901.

Veterinarian with 3rd U. S. Cavalry, January 10, 1908, to April 3, 1917, on which date he accepted a commission as 1st Lieutenant in the Veterinary Corps, Regular Army, with rank

from June 3, 1916. (Served as veterinarian with Cavalry, Philippine Department, July 5, 1913, to December 13, 1915.)

Served in France August 6, 1917, to July 12, 1919. Returning from France, he was assigned to duty for brief periods at Camp Funston, Kansas, Headquarters Eastern Purchasing Zone, Louisville, Ky., Camp Gordon, Ky., and Camp Taylor, Ky., until January 17, 1921, at which time he was ordered to the Veterinary School of Meat and Dairy Hygiene at Chicago, Ill., for a course of instruction. Successfully completing the course on June 15, 1921, Colonel Mitchell was ordered to duty at Camp Pike, Ark., remaining at that station until February 21, 1922, at which time he was assigned as veterinarian to the 2nd Division, Fort Sam Houston, Texas. He served with this organization until August 15, 1925, when he was ordered to Fort Oglethorpe, Ga., at which station he served until his death, October 16, 1927.

Colonel Mitchell was promoted to the grade of Lieutenant-Colonel on July 25, 1927.

With the death of Colonel Mitchell the Veterinary Corps of the Regular Army loses one of its most valued officers—a man who was held in high esteem by all who knew him and one who was ever actuated by the kindest motives in his dealings with others.

W. G. T.

ROY G. SMITH

Dr. Roy G. Smith, of Chargin Falls, Ohio, died July 7, 1927, following an attack of acute indigestion. He was a graduate of Ohio State University, class of 1917, and was in general practice. Dr. Smith is survived by his widow.

E. K. KANE

Dr. E. K. Kane, of Warren, Illinois, died at his home, August 29, 1927. About three years previously he suffered a stroke of paralysis, and for a year prior to his death he had been confined to his home, practically helpless.

Dr. Kane was a graduate of the Ontario Veterinary College, class of 1891. He enjoyed a large practice in Jo Daviess County and adjoining territory. For many years he served as a director of the Warren Fair Association. He is survived by his widow, one son and two daughters.

FRANK BALES

Dr. Frank Bales, of Darlington, Indiana, died August 30, 1927, in the Methodist Hospital, Indianapolis.

Born at Dana, Indiana, Dr. Bales attended Purdue University and Ontario Veterinary College. He was graduated from the latter institution in 1890, and practiced at Monticello, Indiana, for about twenty years. He then moved to his farm. His wife died about four years ago. Five sons survive him.

E. E. B.

ALLAN RITCHIE ROWAT

Dr. A. R. Rowat, of Honokaa, Hawaii, died suddenly, September 19, 1927. Born at Manotick, Canada, in November, 1861, Dr. Rowat attended grammar school and business college, then the Montreal Veterinary College and later McGill University, being graduated from both institutions, in 1887 and 1891, respectively.

Dr. Rowat joined the A. V. M. A. in 1925.

JOHN F. ARNOLD

Dr. John F. Arnold, of Brooklyn, N. Y., died September 16, 1927, at Brooklyn. He was a graduate of Cornell University, class of 1916.

C. LEE CHOLLAR

Dr. Clarence Lee Chollar, of Maysville, Ky., died at his home, November 6, 1927, after a serious illness dating back three weeks. Two years ago Dr. Chollar was struck by an automobile and it is believed that his fatal illness was the outcome of injuries received at that time. He was 52 years of age.

Born in Norwalk, Ohio, Dr. Chollar received his preliminary education in the local schools. His veterinary training was received at the Ontario Veterinary College, from which he was graduated in 1908. He was located at Bloomsburg, Pa., and later in Kansas. He went to Kentucky in 1914 and was the only graduate veterinarian in Mason County at the time of his death.

Dr. Chollar held the position of County Inspector of Live Stock for nine years. He is survived by his widow, two daughters and a sister.

JAMES BOYD

Dr. James Boyd, of Milpitas, Calif., died suddenly in his office, October 29, 1927.

Born in Pittsburgh, Pa., May 15, 1855, Dr. Boyd received his elementary education in the schools of the Smoky City and then attended the Virginia Polytechnic Institute, at Blacksburg. In 1880 he went to California and considerably later took up the study of veterinary medicine at the San Francisco Veterinary College. He was graduated in 1907 and returned to Milpitas, where he established a fine practice. He was a director of the local Fair Association and for about twenty years was treasurer of the California State Veterinary Medical Association.

Dr. Boyd joined the A. V. M. A. in 1911. He is survived by his widow and one son.

JAMES P. DORAN

Dr. James P. Doran died in the Chicago Hospital, November 11, 1927, following an overdose of a sleeping potion, according to a press report. Dr. Doran was a veterinary inspector at the Union Stock Yards. He was 52 years of age and a graduate of the Chicago Veterinary College, class of 1899. It is believed that Dr. Doran was despondent over the death of his wife, about a year ago.

Our sympathy goes out to Dr. George W. Dickey, of Colorado Springs, Colo., in the death of his wife; to Dr. O. F. Hoekzema, of McBain, Mich., in the death of his mother; and to Dr. B. L. Strohl, of Paris, Ill, in the death of his father.

PERSONALS**MARRIAGE**

Dr. John H. Meany (Ont. '03), to Mrs. Alice McCarthy, both of Athol, Mass., September 19, 1927, at Athol, Mass.

BIRTHS

To Dr. and Mrs. T. Earl Nichols, of Columbus, Ohio, a son, Richard Reeves, Sept. 15, 1927.

To Dr. and Mrs. Frederick H. Kelly, of Goldfield, Iowa, a son, Frederick H. Jr., October 30, 1927.

To Dr. and Mrs. G. L. Stringham, of Wappingers Falls, N. Y., a daughter, October 30, 1927.

PERSONALS

Dr. L. L. Cordell (Cin. '14) has removed from Hoagland, Ind., to Winamac, Ind.

Dr. C. C. Hunt (Ind. '10), formerly of Lima, Ohio, is now located at Ward, S. D.

Dr. Burt J. Cady (Corn. '04) has removed from Belmont, N. Y., to Delmar, N. Y.

Dr. M. C. Hawn (Iowa '27) has removed from Tecumseh, Nebr., to Webster City, Iowa.

Dr. S. C. Shannon (McK. '17), formerly of Rutland, Ill., has located at Ransom, Ill.

Dr. A. M. Mills (Corn. '20) has removed from Washingtonville, N. Y., to Goshen, N. Y.

Dr. A. W. Nyline (Iowa '25), formerly of Clinton, Ill., is now located at Hinckley, Minn.

Dr. E. D. Martin (O. S. U. '11) has removed from Carrollton, Ohio, to Wilmington, Ohio.

Dr. Horace B. F. Jervis (Ont. '04) has removed from Sawtelle, Calif., to Beverly Hills, Calif.

Dr. Gerald S. Harshfield (O. S. U. '26) has removed from East Liberty, Ohio, to Cadiz, Ohio.

Dr. Peter Garside (Chi. '10), of Bourbon, Ind., has gone to Daytona Beach, Fla., for the winter months.

Dr. Ralph S. Whitney (Corn. '16) is conducting the Arnold Small Animal Hospital, in Brooklyn, N. Y.

Dr. W. Walter Martin (U. P. '95), of Spring Lake, N. J., has gone to Miami, Fla., where he will spend the winter months.

Dr. F. E. Stiles (McK. '09), of Battle Creek, Mich., has been reappointed Live Stock Agent for Calhoun County, Mich.

Dr. Wm. C. Prouse (U. P. '07), of Minneapolis, Minn., moved to a new location, November 1, at 2917 Lyndale Ave., South.

Dr. Robert H. Nutt (O. S. U. '09), of Henderson, Ky., is at present confined at his home, convalescing from an operation for appendicitis.

Dr. C. R. Strange (Colo. '23), of Johnstown, Colo., is taking postgraduate work in the Department of Veterinary Science, University of Wisconsin.

Dr. Irvin F. Brenning (Corn. '23) has purchased the practice of Dr. James Pendergast (Ont. '91), of Syracuse, N. Y. He took possession November 6.

Dr. C. G. Glendenning (Ont. '89) has resumed practice at Clinton, Ill., after an absence from the city of about two years, spent in Florida and other places.

Dr. D. C. Grinnell (McK. '11), of Libertyville, Ill., has been reappointed Lake County Veterinarian for another two-year term, dating from November 1.

Dr. W. T. Miller (K. S. A. C. '24), of Fontana, Calif., is at the University of Wisconsin this year, pursuing postgraduate studies in the Department of Veterinary Science.

Dr. R. S. Amadon (O. S. U. '16) will be in charge of the new physiological laboratory which is now being equipped at the School of Veterinary Medicine, University of Pennsylvania.

Dr. H. Glenn Ricker (U. P. '20), who has been engaged in general practice at Millheim, Pa., has accepted a position on the dairy inspection force of the Supplee-Wills-Jones Co., Philadelphia, Pa.

Dr. Harry Hedin (McK. '18), who severed his connection with the Minnesota State Live Stock Sanitary Board July 1, is now associated with Dr. L. A. Benson (Ont. '07), of Grand Forks, N. Dak.

Dr. P. H. Browning (Chi. '03), formerly Territorial Veterinarian of Hawaii, recently opened a new small-animal hospital, completely and modernly equipped, at 66 N. San Pedro St., San Jose, Calif.

Dr. J. F. Mitchell (Corn. '11), who is engaged in veterinary work for the Cerro de Pasco Copper Corporation in South America, was a visitor at the New York State Veterinary College, Ithaca, on November 5.

Dr. Charles O. Neuhaus (U. P. '12), of the Pennsylvania Bureau of Animal Industry, recently was arrested and held in \$2,500 bail for trespass, while making tuberculin tests in Montgomery County. Later the charges were withdrawn.

Dr. F. S. Jones (U. P. '08), of the Department of Animal Pathology of the Rockefeller Institute for Medical Research, Princeton, N. J., has been appointed a member of the Committee on Methods and Standards of the American Association of Medical Milk Commissions.

Dr. J. T. Brown (K. C. V. C. '15) has resigned his position with the Western Weighing and Inspection Bureau at East St. Louis, Ill., to accept the appointment of St. Clair County (Ill.) Veterinarian, succeeding Dr. C. B. Michels (Chi. '17), who resigned the position recently.

Dr. Malcolm J. Harkins (U. P. '12), who is associated with the Research Institute for Cutaneous Diseases, Philadelphia, has been engaged to assist Dr. C. J. Marshall (U. P. '94), of the Veterinary School, University of Pennsylvania, in giving the courses in medicine this year.

Dr. F. E. Myers (Ont. '12), of Gladwin, Mich., has been appointed Live Stock Agent for Gladwin County, by the Board of Supervisors. Dr. Myers formerly held the office of County Sheriff and is now acting as undersheriff, Mrs. Myers having succeeded to the office of Sheriff.

Dr. H. E. VanDerVeen (Chi. '17), who has been located in Chicago with Borden's Farm Products Company of Illinois for several years, has been transferred to Genoa City, Wis., where he will have charge of dairy inspection work in the vicinity of Genoa and Bassett, Wisconsin.

Dr. Don R. Coburn (Mich. '24), formerly in charge of tuberculosis eradication work in Cass County, Michigan, has been transferred to Tuscola County to succeed Dr. E. F. Meyer, whose appointment as Chief Milk Inspector for the City of Grand Rapids was reported in the November issue of the JOURNAL.

Dr. L. A. Klein (U. P. '97), dean of the School of Veterinary Medicine, University of Pennsylvania, has been reappointed a member of the Committee on Methods and Standards of the American Association of Medical Milk Commissions. This is the fourth year that Dr. Klein has been appointed to serve on this committee.

